



1296-M018-0_R

**G2.120R
G2.121R
G2.121RFM**

INSTRUCTION MANUAL

GB

TRANSLATION FROM THE
ORIGINAL INSTRUCTIONS

For spare parts drawings refer to the section "LIST OF COMPONENTS" enclosed to this manual.

- For any further information please contact your local dealer or call:

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1296-M018-0_R - Rev. n. 0 (07/2019)



SUMMARY

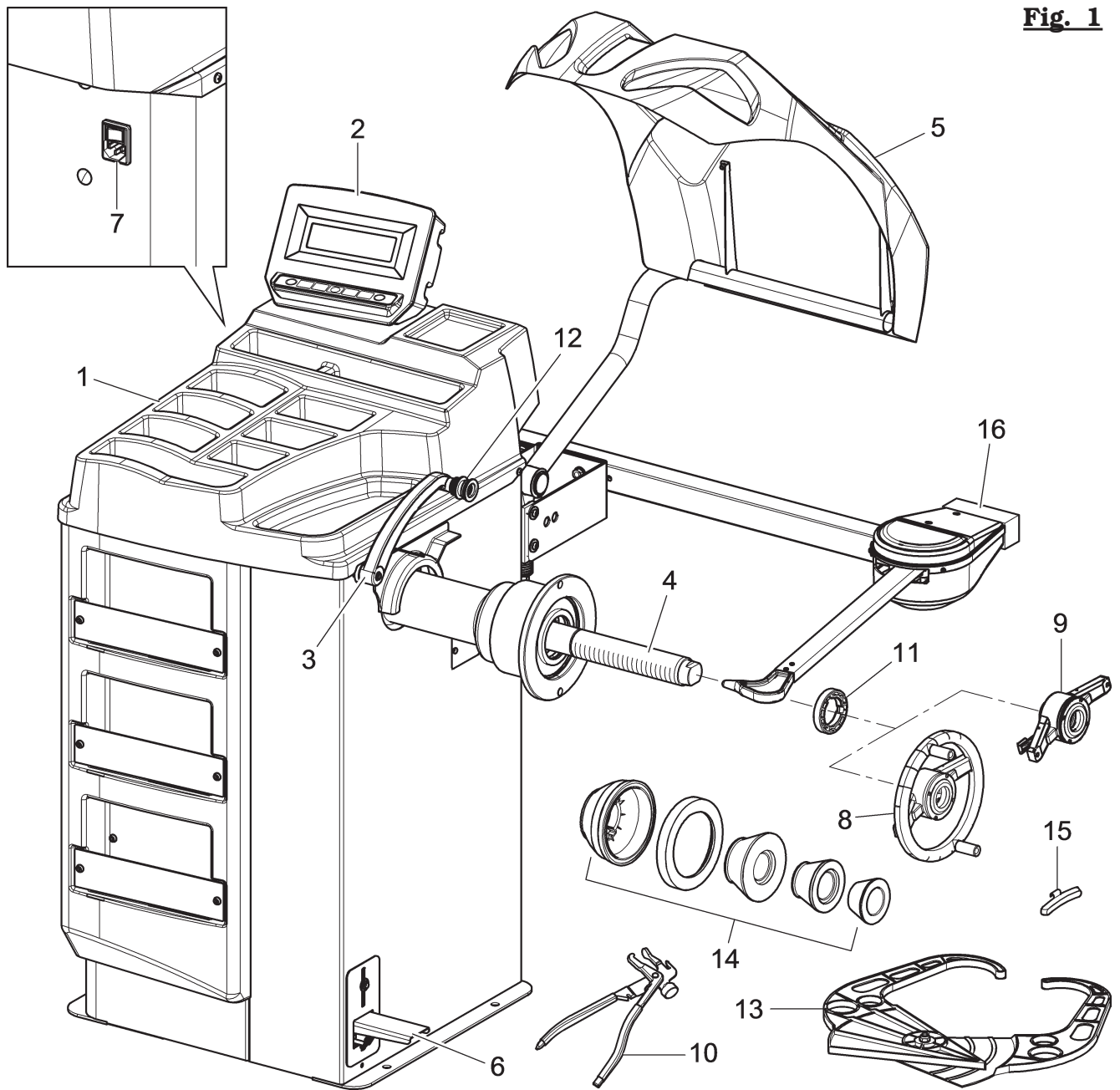
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Fig. 1














KEY

- 1 - Weight holding bridge
- 2 - LCD display/control panel
- 3 - Distance caliper
- 4 - Threaded shaft
- 5 - Protection guard (only for G2.121R - G2.121RFM models)
- 6 - Pedal brake (only for G2.121RFM model)
- 7 - Main switch
- 8 - Ring nut with handwheel (only for G2.120R model)
- 9 - Rapid ring nut (only for G2.121R - G2.121RFM models)
- 10 - Grippers for weights
- 11 - Pressure ring
- 12 - Grippers for weight fitting
- 13 - Manual caliper
- 14 - Cones + protection cup
- 15 - Carriages counterweight
- 16 - External data gauge (optional)



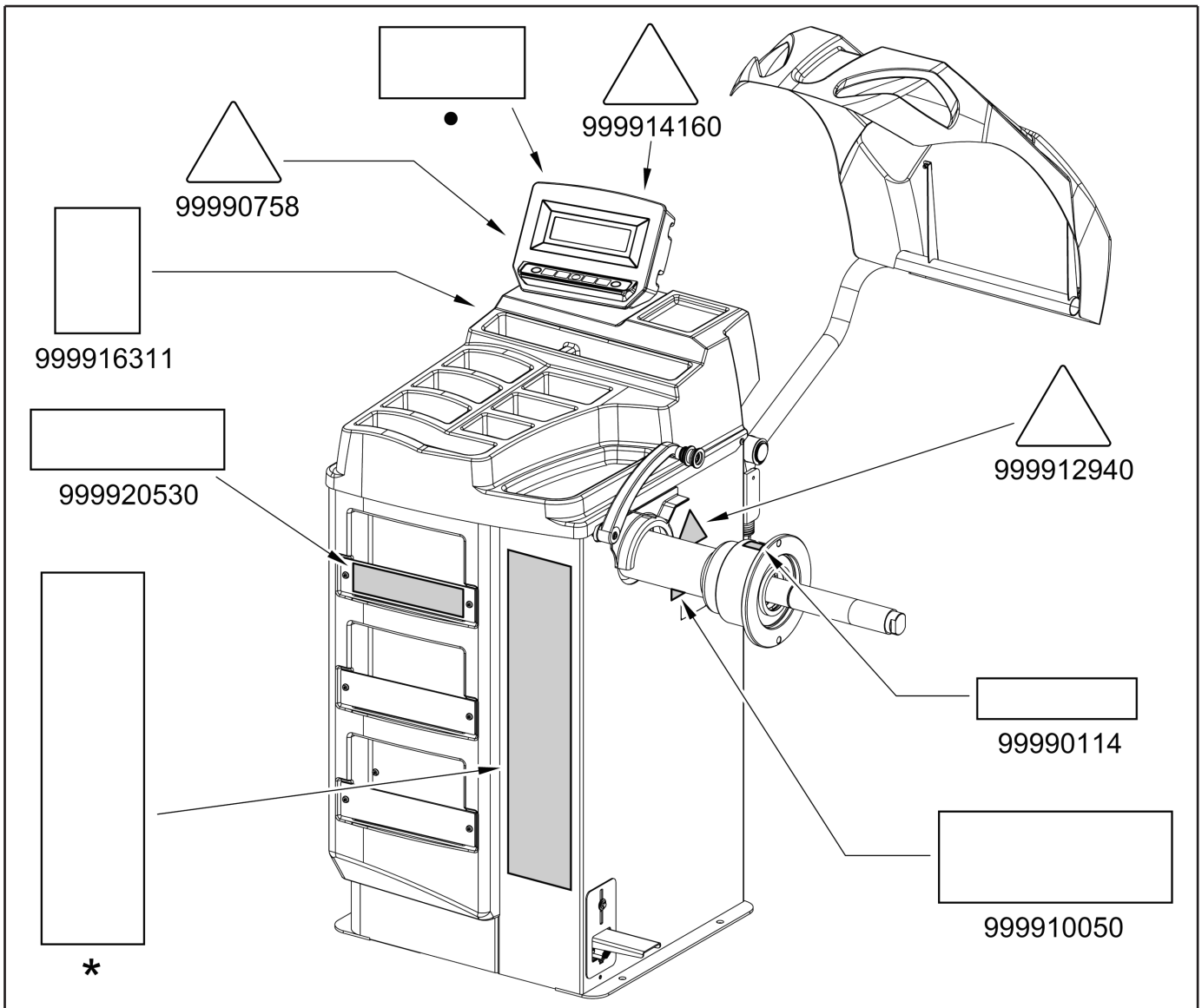
SYMBOLS USED IN THE MANUAL

Symbols	Description
	Read instruction manual.
	Wear work gloves.
	Wear work shoes.
	Wear safety goggles.
	Warning. Be particularly careful (possible material damages).
	Mandatory. Operations or jobs to be performed compulsorily.

Symbols	Description
	Danger! Be particularly careful.
	Move with fork lift truck or pallet truck.
	Lift from above.
	Note. Indication and/or useful information.
	Attention: never lift the machine by means of the mandrel.



INFORMATION PLATE LOCATION TABLE



Code numbers of plates

99990114	<i>Arrow plate</i>
99990758	<i>Electricity danger plate</i>
999910050	<i>Protection device use plate</i>
999912940	<i>Lifting plate</i>
999914160	<i>Voltage 230V 50/60 Hz 1 Ph plate</i>
999916311	<i>Rubbish skip label</i>
999920530	<i>New G2 logo plate</i>
•	<i>Serial number plate</i>
*	<i>Manufacturer plate</i>



IF ONE OR MORE PLATES DISAPPEAR FROM THE MACHINE OR BECOMES DIFFICULT TO READ. REPLACE IT AND QUOTE ITS/THEIR CODE NUMBER/S WHEN REORDERING.



SOME OF THE PICTURES AND/OR DISPLAY SCREEN PAGES PRESENT IN THIS MANUAL HAVE BEEN OBTAINED FROM PICTURES OF PROTOTYPES, THEREFORE THE STANDARD PRODUCTION MACHINES AND ACCESSORIES CAN BE DIFFERENT IN SOME COMPONENTS/DISPLAY SCREEN PAGES.

1.0 GENERAL INTRODUCTION

This manual is an integral part of the product and must be retained for the whole operating life of the machine.

Carefully study the warnings and instructions contained in this manual. It contains important instructions regarding **FUNCTIONING, SAFE USE and MAINTENANCE.**



KEEP THE MANUAL IN A KNOWN, EASILY ACCESSIBLE PLACE FOR ALL ACCESSORY OPERATORS TO CONSULT IT WHENEVER IN DOUBT.



THE MANUFACTURER DISCLAIMS ALL RESPONSIBILITY FOR ANY DAMAGE OCCURRED WHEN THE INDICATIONS GIVEN IN THIS MANUAL ARE NOT RESPECTED: AS A MATTER OF FACT, THE NON-COMPLIANCE WITH SUCH INDICATIONS MIGHT LEAD TO EVEN SERIOUS DANGERS.

1.1 Introduction

Thank you for preferring this wheel balancer. We feel sure you will not regret your decision.

This machine has been designed for use in professional workshops and stands out for its reliability and easy, safe and rapid operation. With just a small degree of maintenance and care, this wheel balancer will give you many years of trouble-free service and lots of satisfaction.

2.0 INTENDED USE

The machines described in this manual and their different versions, are wheels balancing machines for car and light transport, projected to be used exclusively to cancel out, or at least reduce to acceptable limits the vibrations of the wheels, by fitting counterweights of suitable size and in specific positions to the wheels that are not correctly balanced



THIS MACHINE MUST BE USED STRICTLY FOR THE INTENDED PURPOSE IT WAS DESIGNED FOR (AS INDICATED IN THIS MANUAL).



THE MANUFACTURER CANNOT BE HELD RESPONSIBLE FOR ANY DAMAGE CAUSED BY IMPROPER, ERRONEOUS, OR UNACCEPTABLE USE.

2.1 Training of personnel

The machine may be operated only by suitably trained and authorized personnel.

Given the complexity of the operations necessary to manage the machine and to carry out the operations safely and efficiently, the personnel must be trained in such a way that they learn all the information necessary to operate the machine as intended by the manufacturer.



A CAREFUL READING OF THIS INSTRUCTION MANUAL FOR USE AND MAINTENANCE AND A SHORT PERIOD OF TRAINING WITH SKILLED PERSONNEL CAN BE AN ENOUGH PREVENTIVE PREPARATION.

3.0 SAFETY DEVICES



PERIODICALLY, AT LEAST MONTHLY, CHECK THE INTEGRITY AND THE FUNCTIONALITY OF THE SAFETY AND PROTECTION DEVICES ON THE MACHINE.

• Controls logic disposition


Its function is to prevent the operator from dangerous mistakes.

• Master switch positioned on the rear of the machine

Its function is to disconnect machine electric supply.

• Protection guard (only for G2.121R - G2.121RFM models)

Its function is to protect the operator from possible projections of materials on the wheel during its spin. Wheel spinning is normally prevented if the wheel protection guard is raised (open). When the protection guard is open, this interrupts the circuit that triggers the motor and automatic start is prevented, including in the case of an error.

Press  (F1) stop key to stop wheel in emergency conditions.

3.1 Residual risks

The machine was subjected to a complete analysis of risks according to reference standard EN ISO 12100. Risks are as reduced as possible in relation with technology and product functionality.

Possible residual risks have been emphasized through pictorial representations and warnings which placing is indicated in "PLATE POSITIONING TABLE" at page 6.

4.0 GENERAL SAFETY RULES



- Any tampering with or modification to the machine not previously authorized by the manufacturer exempts the latter from all responsibility for damage caused by or derived from said actions.
- Removing of or tampering with the safety devices or with the warning signals placed on the machine leads to serious dangers and represents a transgression of European safety rules.
- Use of the machine is only permitted in places free from **explosion** or **fire** hazard and in **dry places under cover**.
- Original spare parts and accessories should be used.



THE MANUFACTURER DENIES ANY RESPONSIBILITY IN CASE OF DAMAGES CAUSED BY UNAUTHORIZED MODIFICATIONS OR BY THE USE OF NON ORIGINAL COMPONENTS OR EQUIPMENT.

- Installation must be conducted only by qualified personnel exactly according to the instructions that are given below.
- Ensure that there are no dangerous situations during the machine operating manoeuvres. Immediately stop the machine if it miss-functions and contact the assistance service of an authorized dealer.
- In emergency situations and before carrying out any maintenance or repairs, disconnect all supplies to the machine by using the main switch, placed on the machine itself, and unplugging the power supply.
- The machine electrical supply system must be equipped with an appropriate earthing, to which the yellow-green machine protection wire must be connected.
- Ensure that the work area around the machine is free of potentially dangerous objects and that there is no oil since this could damage the tyre. Oil on the floor is also a potential danger for the operator.
- UNDER NO CIRCUMSTANCES must the machine be used to spin anything but vehicle wheels. Bad locking can cause rotating parts to come loose, with potential damage to the machine and anything in the vicinity and injury to the operator.



OPERATORS MUST WEAR SUITABLE WORK CLOTHES, PROTECTIVE GLASSES AND GLOVES, AGAINST THE DANGER FROM THE SPRAYING OF DANGEROUS DUST, AND POSSIBLY LOWER BACK SUPPORTS FOR THE LIFTING OF HEAVY PARTS. DANGLING OBJECTS LIKE BRACELETS MUST NOT BE WORN, AND LONG HAIR MUST BE TIED UP. FOOTWEAR SHOULD BE ADEQUATE FOR THE TYPE OF OPERATIONS TO BE CARRIED OUT.

- The machine handles and operating grips must be kept clean and free from oil.
- The workshop must be kept clean and dry. Make sure that the working premises are properly lit. The machine can be operated by a single operator. Unauthorized personnel must remain outside the working area, as shown in **Fig. 3**. Avoid any hazardous situations. Do not use air-operated or electrical equipment when the shop is damp or the floor slippery and do not expose such tools to atmospheric agents.
- When operating and servicing this machine, carefully follow all applicable safety and accident-prevention precautions. The machine must not be operated by professionally unskilled persons.

5.0 PACKING AND MOBILIZATION FOR TRANSPORT

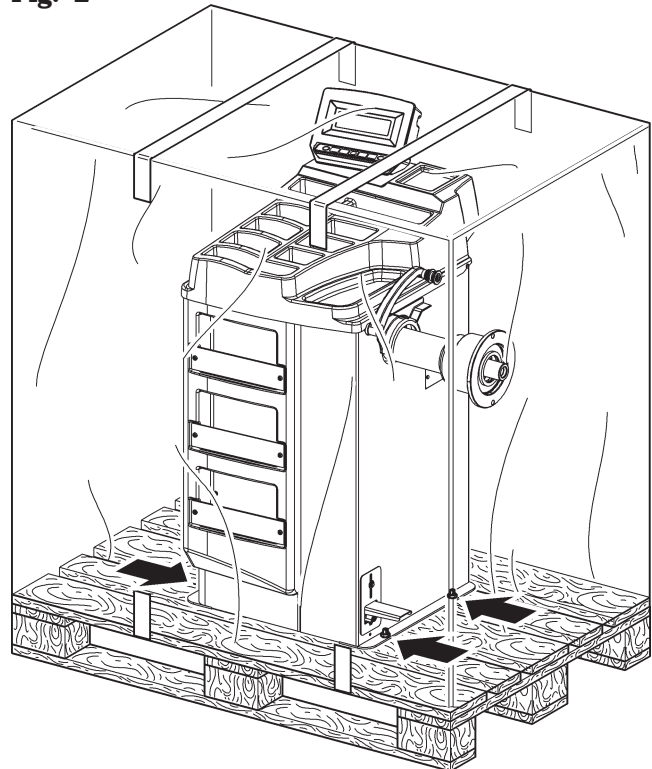


HAVE THE MACHINE HANDLED BY SKILLED PERSONNEL ONLY.

THE LIFTING EQUIPMENT MUST WITHSTAND A MINIMUM RATED LOAD EQUAL TO THE WEIGHT OF THE PACKED MACHINE (SEE PARAGRAPH "TECHNICAL SPECIFICATIONS").

The machine is packed partially assembled. Movement must be by pallet-lift or fork-lift trolley. The fork lifting points are indicated on the packing.

Fig. 2





6.0 UNPACKING



DURING UNPACKING, ALWAYS WEAR GLOVES TO PREVENT ANY INJURY CAUSED BY CONTACT WITH PACKAGING MATERIAL (NAILS, ETC.).



The cardboard box is supported with plastic strapping. Cut the strapping with suitable scissors. Use a small knife to cut along the lateral axis of the box and open it like a fan.

It is also possible to unnailed the cardboard box from the pallet it is fixed to. After removing the packing, and in the case of the machine packed fully assembled, check that the machine is complete and that there is no visible damage.

If in doubt **do not use the machine** and refer to professionally qualified personnel (to the seller).

The packing (plastic bags, expanded polystyrene, nails, screws, timber, etc.) should not be left within reach of children since it is potentially dangerous. These materials should be deposited in the relevant collection points if they are pollutants or non biodegradable.



THE BOX CONTAINING THE FIXTURES IS CONTAINED IN THE WRAPPING. DO NOT THROW IT AWAY WITH THE PACKING.

7.0 MOBILIZATION



THE LIFTING EQUIPMENT MUST WITHSTAND A MINIMUM RATED LOAD EQUAL TO THE WEIGHT OF THE MACHINE (SEE PARAGRAPH TECHNICAL SPECIFICATIONS). DO NOT ALLOW THE LIFTED MACHINE TO SWING.



NEVER LIFT THE MACHINE BY MEANS OF THE MANDREL.

If the machine has to be moved from its normal work post, the movement must be conducted following the instructions listed below.

- Protect the exposed corners with suitable material (Pluribol/cardboard).
- Do not use metallic cables for lifting.
- Make sure that the electricity supply is not connected.
- Place again the machine onto the original pallet with whom it was delivered.
- Use transpallet or fork-lift for handling.

8.0 WORKING ENVIRONMENT CONDITIONS

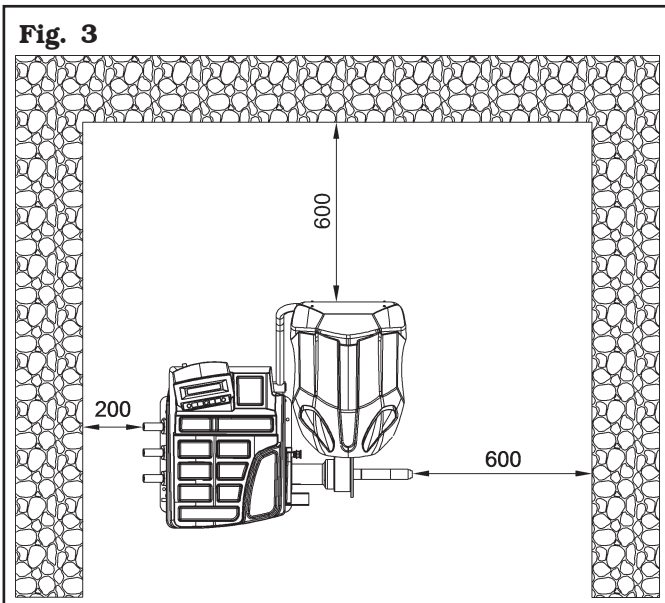
The machine must be operated under proper conditions as follows:

- temperature: 0° + 45° C
- relative humidity: 30 - 90% (dew-free)
- atmospheric pressure: 860 - 1060 hPa (mbar).

The use of the machine in ambient conditions other than those specified above is only allowed after prior agreement with and approval of the manufacturer.

8.1 Working area

Fig. 3



USE THE MACHINE IN A DRY AND ADEQUATELY LIT PLACE, POSSIBLY INDOORS OR ANYWAY IN A ROOFED AREA, THIS PLACE MUST BE IN COMPLIANCE WITH APPLICABLE SAFETY REGULATIONS.

The location of the machine requires a usable space as indicated in **Fig. 3**. The positioning of the machine must be according to the distances shown. From the control position the operator is able to observe all the machine and surrounding area. He must prevent unauthorized personnel or objects that could be dangerous from entering the area. The machine must be fixed on a flat floor surface, preferably of cement or tiled. Avoid yielding or irregular surfaces.

The base floor must be able to support the loads transmitted during operation.

This surface must have a capacity load of at least 500 kg/m².

The depth of the solid floor must be sufficient to guarantee that the anchoring bolts hold.

8.2 Lighting

The machine does not require its own lighting for normal working operations. However, it must be used in an adequately lit environment.

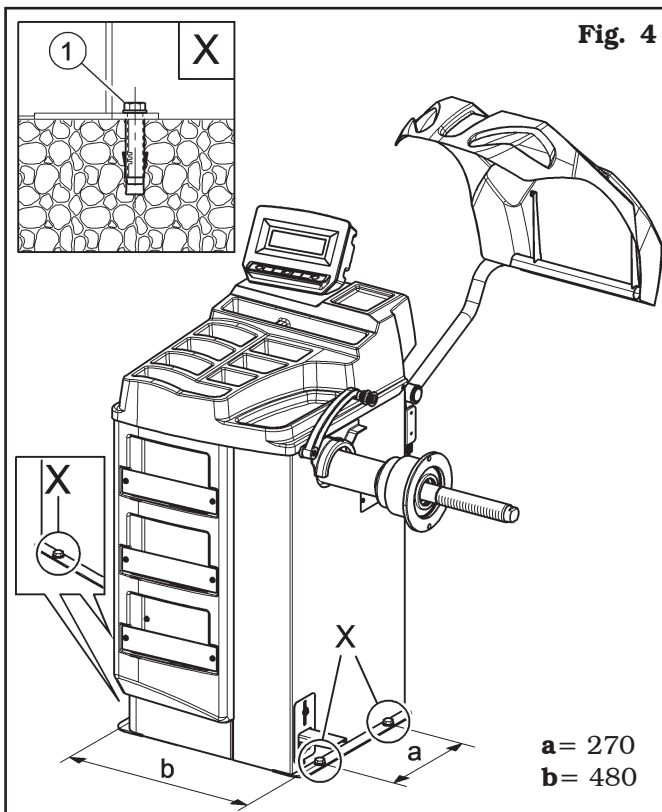
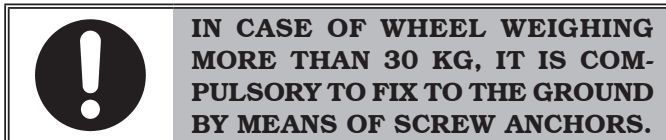
In case of poor lighting use lamps having total power of 800/1200 Watt.

9.0 MACHINE ASSEMBLY

After having freed the various components from the packing check that they are complete, and that there are no anomalies, then comply with the following instructions for the assembly of the components making use of the attached series of illustrations.

9.1 Anchoring system

The packed machine is fixed to the support pallet through the holes prearranged on the frame. Such holes can be used also to fix the machine to the ground, through floor anchor small blocks (excluded from supply). Before carrying out the definitive fixing, check that all the anchor points are laid down flat and correctly in contact with the fixing surface itself. If not so, insert shimming profiles between the machine and the fixing lower surface, as indicated in **Fig. 4**.



- Execute 4 holes with 10 mm diameter on the floor by the holes on the bottom floor;
- insert the small blocks (excluded from supply) into the holes;
- fix the machine to the ground with 4 M8x80 mm screws (excluded from supply) (**Fig. 4 ref. 1**) (or with 4 8x80 mm stud bolts (excluded from supply)). Tighten the screws with an approximate tightening torque of 70 Nm.

9.2 Fixtures contained in the packing

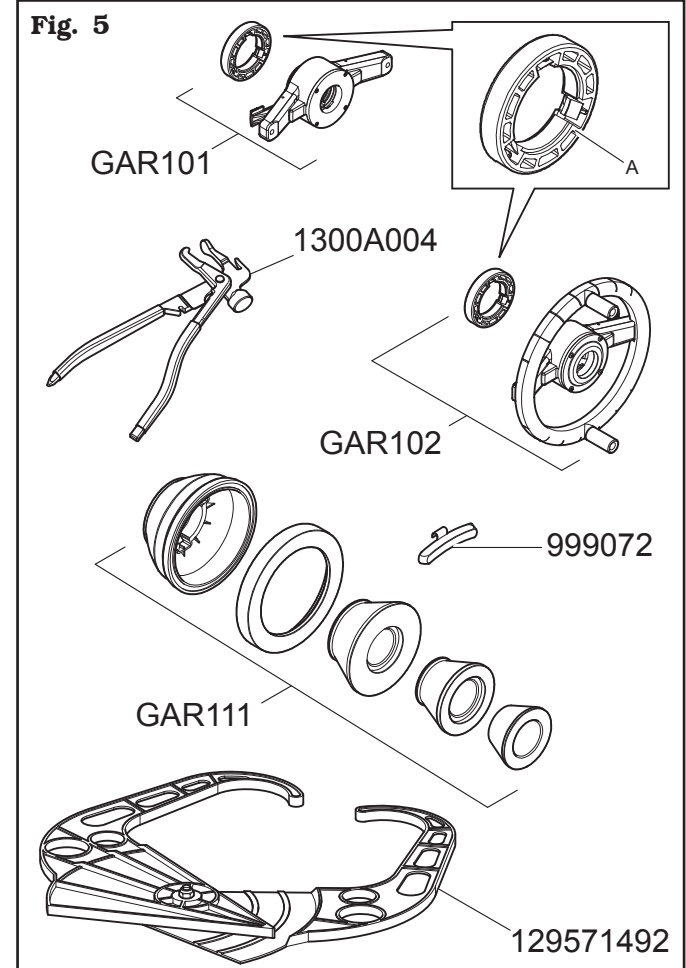
The packing case contains also the fixtures box. Check that all the parts listed below are there (see **Fig. 5**).

For **G2.120R** model

Code	Description	N.
GAR102	Ring nut with handwheel + pressure ring	1
GAR111	Cones + protection cup	1
129571492	External data gauge	1
1300A004	Weight pliers	1
999072	Carriages counterweight	1

For **G2.121R - G2.121RFM** models

Code	Description	N.
GAR101	Rapid ring nut + pressure ring	1
GAR111	Cones + protection cup	1
129571492	External data gauge	1
1300A004	Weight pliers	1
999072	Carriages counterweight	1





THE PRESSURE RING (FIG. 5 REF. A) MUST BE MOUNTED WITH THE TEETH OR DISCHARGE SIDE TOWARDS THE RING-NUT (SEE FIG. 5).

9.3 Assembly procedures

9.3.1 Fitting the shaft on the flange

Screw the shaft with an Allen wrench (Fig. 6 ref. 1) on the flange (Fig. 6 ref. 2).

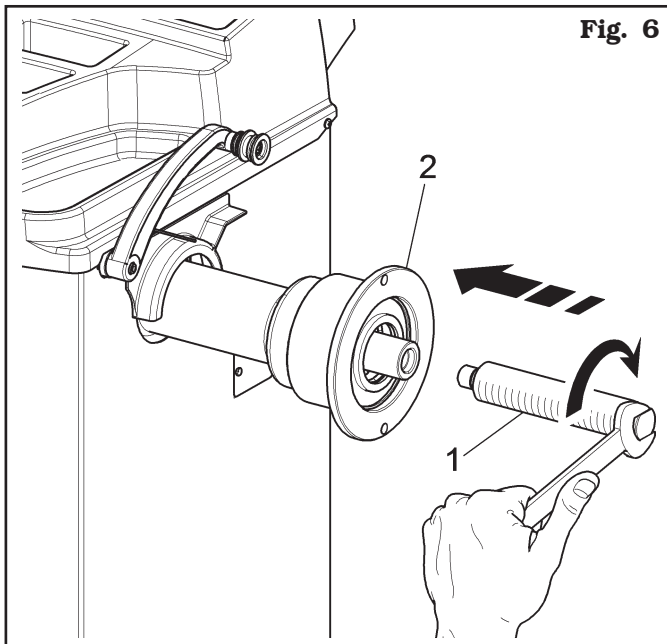
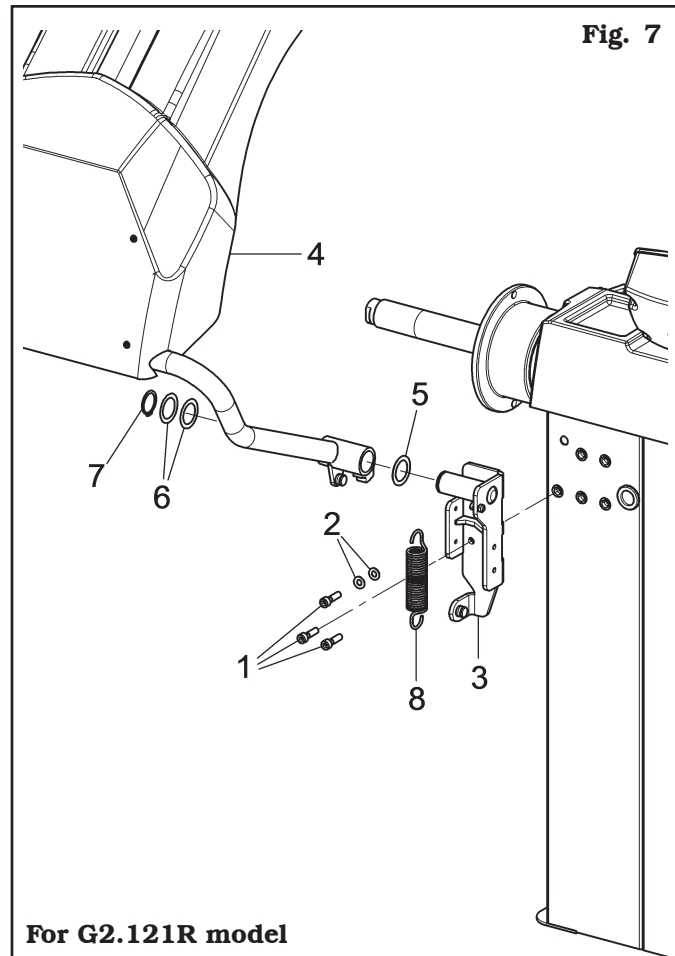


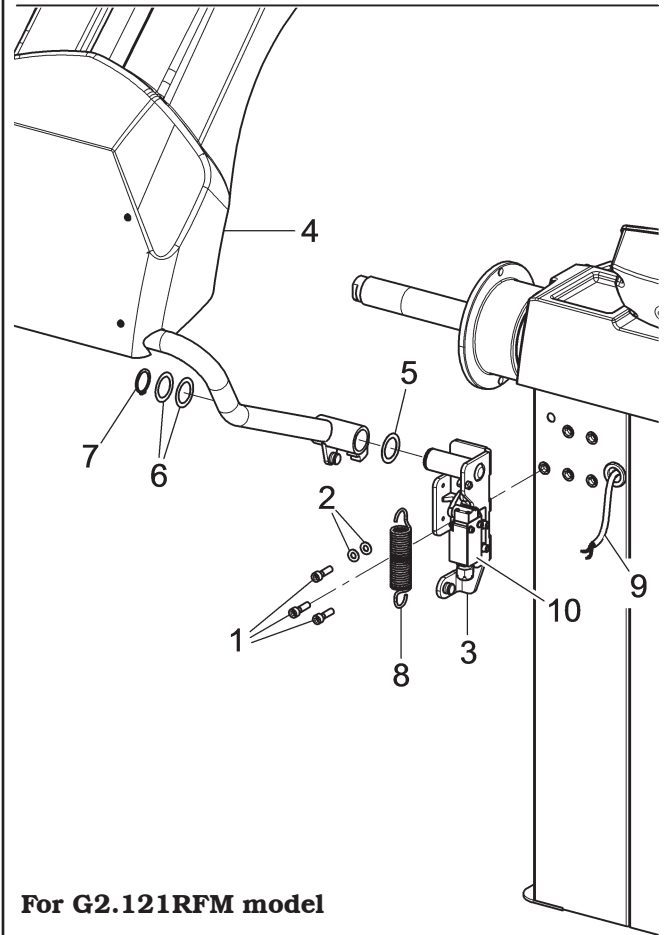
Fig. 6

9.3.2 Fitting the protection guard

1. Screw the 3 screws (Fig. 7 ref. 1) and the washers (Fig. 7 ref. 2) to the guard support (Fig. 7 ref. 3) in the special inserts positioned in the rear side of the frame, by means of an Allen wrench. Mount the protection guard (Fig. 7 ref. 4) to the support (Fig. 7 ref. 3) interposing the washers (Fig. 7 ref. 5 and 6) and block it through the seeger (Fig. 7 ref. 7).
2. Fit the spring (Fig. 7 ref. 8) between the base of the support and the anchor pin.
3. Connect the 2 wires (Fig. 7 ref. 9) from inside the frame to the normally open (NO) microswitch contacts (Fig. 7 ref. 10).



For G2.121R model



For G2.121RFM model

9.3.3 Fitting of external data gauge (optional)

1. Unscrew the screws (**Fig. 8 ref. 10**) and the washers (**Fig. 8 ref. 11**) from the wheel cover support, being very careful about holding the same support. Insert the gauge bracket (**Fig. 8 ref. 2**) into the lateral slot of the wheel cover support (see **Fig. 10 ref. A**).

Fit the fixing screw (**Fig. 8 ref. 1**) and screws (**Fig. 8 ref. 10**), previously unscrewed, into the gauge bracket (**Fig. 8 ref. 2**); then screw the assembly to the threaded rivets placed on the rear part of the frame, without using the previously unscrewed washers (**Fig. 8 ref. 11**).

Lock the gauge arm (**Fig. 8 ref. 3**) to the brackets (**Fig. 8 ref. 2-4**) using the 2 screws (**Fig. 8 ref. 5**), the washers (**Fig. 8 ref. 6**) and the nuts (**Fig. 8 ref. 7**), so that the shaft and the gauge arm are levelled (see **Fig. 9**).

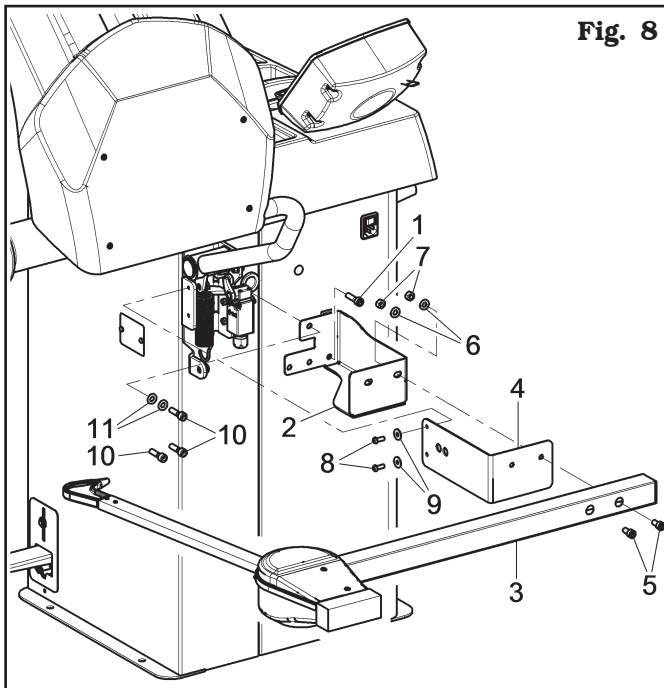


Fig. 8

2. Also make sure the gauge tip (**Fig. 9 ref. 1**) is positioned at the centre of the mandrel.

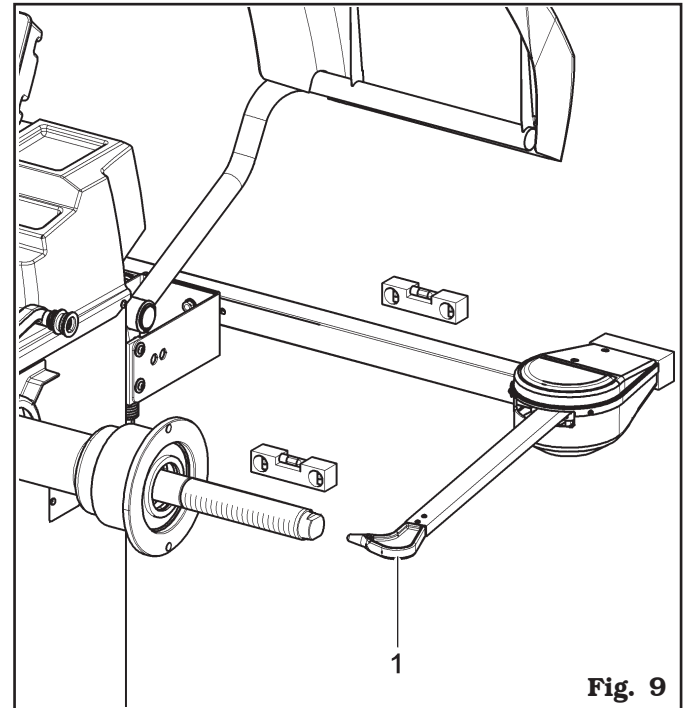


Fig. 9

3. Connect connector (**Fig. 10 ref. 1**) of the cable coming from inside the machine to connector (**Fig. 10 ref. 2**) of the cable coming from the gauge arm. Fit the section of the cable with the connectors inside the arm (**Fig. 10 ref. 3**).

4. Fasten the cable with clamps.

5. Enable the external data gauge and carry out the device's calibration.

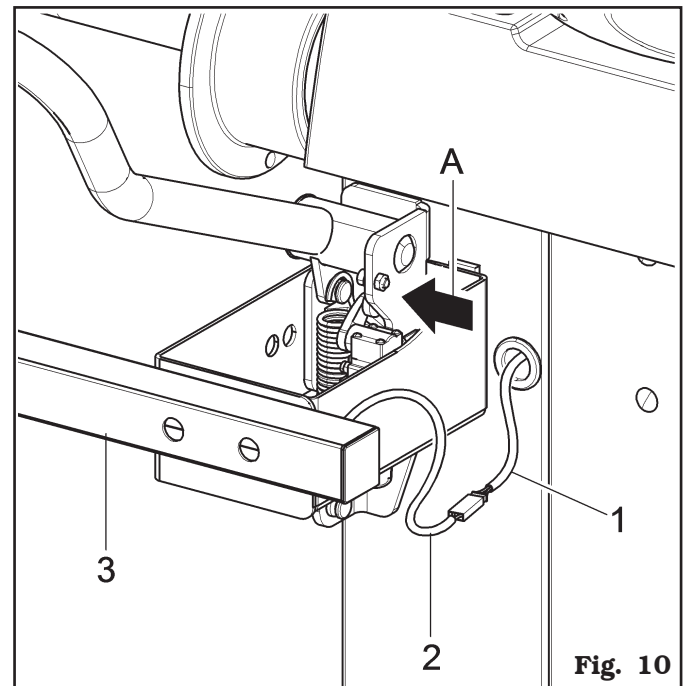


Fig. 10

10.0 ELECTRICAL CONNECTIONS



EVEN THE TINIEST PROCEDURE OF AN ELECTRICAL NATURE MUST BE CARRIED OUT BY PROFESSIONALLY QUALIFIED STAFF.



BEFORE CONNECTING THE MACHINE MAKE SURE THAT:

- THE MAIN POWER RATING CORRESPONDS TO THE MACHINE RATING AS SHOWN ON THE MACHINE PLATE;
- ALL MAIN POWER COMPONENTS ARE IN GOOD CONDITION;
- THE ELECTRICAL SYSTEM IS PROPERLY GROUNDED (GROUND WIRE MUST BE THE SAME CROSS-SECTION AREA AS THE LARGEST POWER SUPPLY CABLES OR GREATER);
- MAKE SURE THAT THE ELECTRICAL SYSTEM FEATURES A CUTOUT WITH DIFFERENTIAL PROTECTION SET AT 30 mA.

Connect the machine up to the mains by means of the 3-pole plug provided (110V - 230V single-phase) through the wall socket.

If the plug provided is not suitable for the wall socket, fit a plug that complies with local and applicable regulations. This operation must be performed by expert and professional personnel.



FIT A TYPE-APPROVED (AS REPORTED BEFORE) PLUG TO THE MACHINE CABLE (THE GROUND WIRE IS YELLOW/GREEN AND MUST NEVER BE CONNECTED TO ONE OF THE TWO PHASE LEADS).



MAKE SURE THAT THE ELECTRICAL SYSTEM IS COMPATIBLE WITH THE RATED POWER ABSORPTION SPECIFIED IN THIS MANUAL AND APT TO ENSURE THAT VOLTAGE DROP UNDER FULL LOAD WILL NOT EXCEED 4% OF RATED VOLTAGE (10% UPON START-UP).



FAILURE TO OBSERVE THE ABOVE INSTRUCTIONS WILL IMMEDIATELY INVALIDATE THE WARRANTY.

10.1 Electrical checks



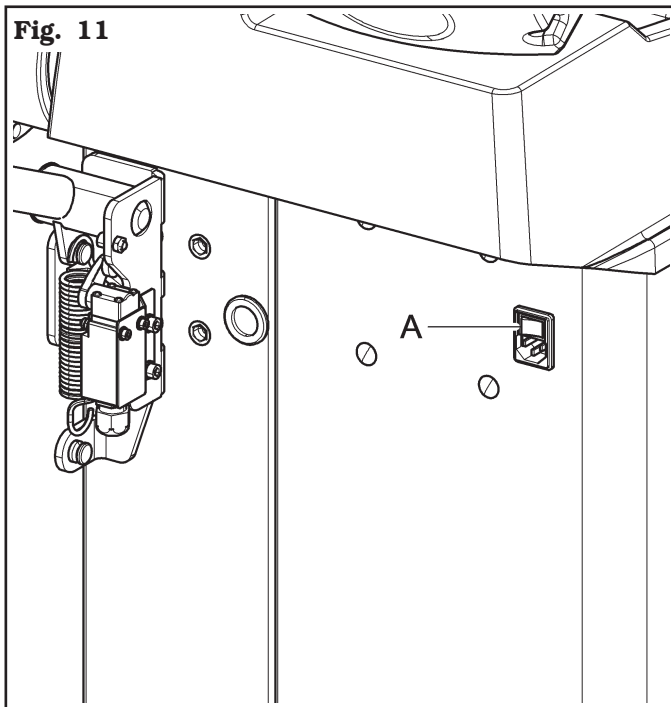
BEFORE STARTING UP THE WHEEL-BALANCER, BE SURE TO BECOME FAMILIAR WITH THE LOCATION AND OPERATION OF ALL CONTROLS AND CHECK THEIR PROPER OPERATION (SEE PAR. "CONTROLS").



CARRY OUT A DAILY CHECK OF MAINTAINED-TYPE CONTROLS CORRECT FUNCTIONING, BEFORE STARTING MACHINE OPERATION.

Once the plug/socket connection has been made, turn on the machine using the master switch (Fig. 11 ref. 1).

Fig. 11



11.0 FITTING THE WHEEL ON THE SHAFT



To achieve perfect balancing, the wheel must be carefully and properly fitted on the shaft. Imperfect centring will inevitably cause unbalances.



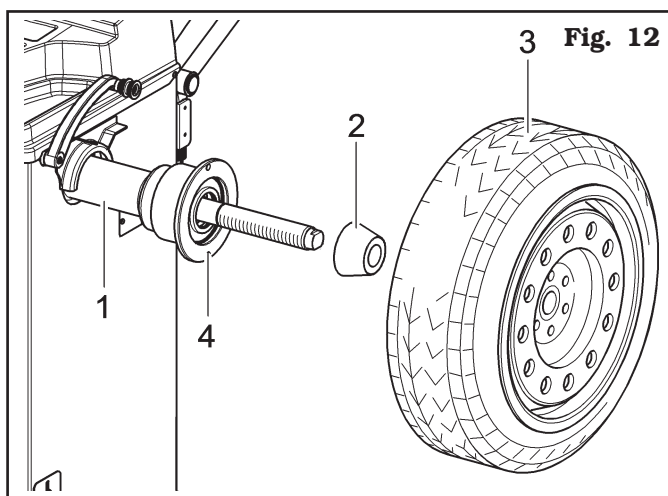
WHAT IS MOST IMPORTANT IS THAT ORIGINAL CONES AND ACCESSORIES, SPECIALLY DESIGNED TO BE EMPLOYED WITH THE WHEEL BALANCERS, ARE USED.

Wheel fitting using the cones provided is illustrated below.

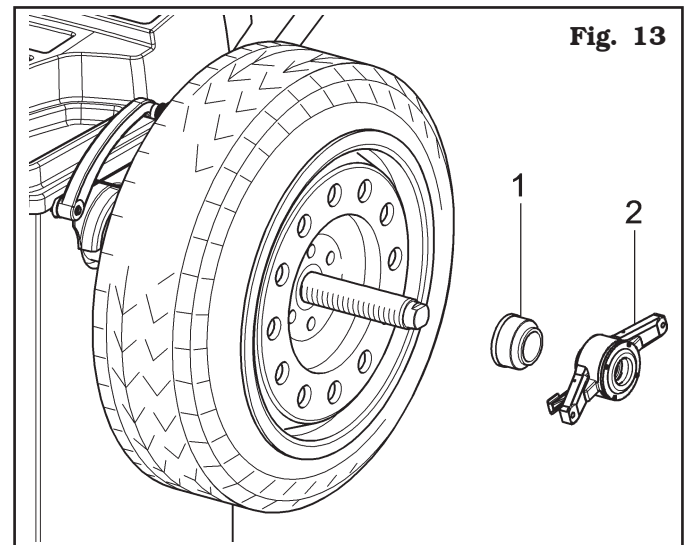
For alternative fittings, using optional accessories, refer to the special instructions provided separately.

11.1 Wheel assembly

1. Remove any type of foreign body from the wheel (**Fig. 12 ref. 3**): already-existing weights, stones and mud, and make sure the shaft (**Fig. 12 ref. 1**) and the rim centring area are clean before fitting the wheel on the shaft.
2. Carefully choose the cone (**Fig. 12 ref. 2**) most suitable for the wheel to be balanced. These accessories must be selected according to the shape of the rim. Carefully position the wheel (**Fig. 12 ref. 3**), fitting the cone (**Fig. 12 ref. 2**) on the shaft (**Fig. 12 ref. 1**) (otherwise this could seize) until this rests against the support flange (**Fig. 12 ref. 4**).
3. Fit the wheel with the inner side of the rim towards the wheel balancer and against the cone.

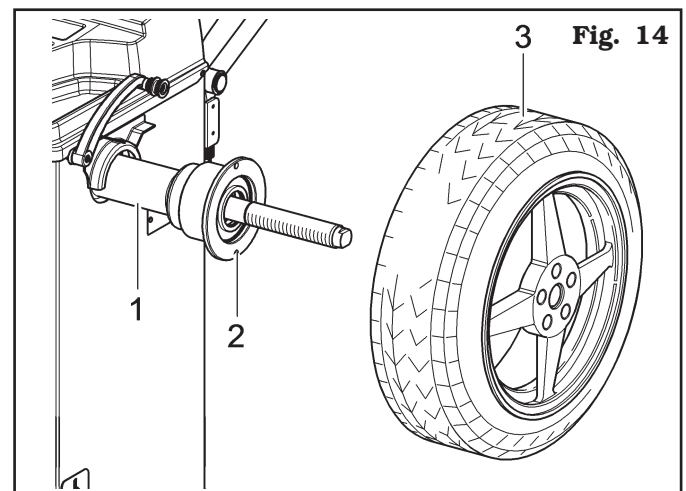


4. Fit the protection cap (**Fig. 13 ref. 1**) in the locknut (**Fig. 13 ref. 2**) and fasten against the wheel.

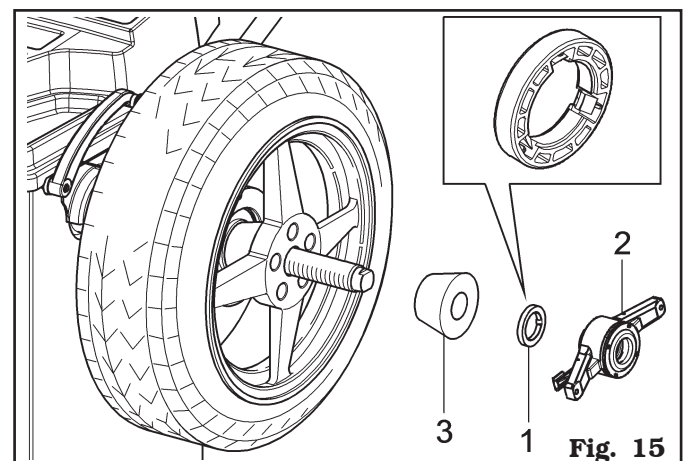


Some aluminium wheels, with very high centring, must be fitted with the cone outside the wheel.

5. Clean the shaft (**Fig. 14 ref. 1**) before fitting the wheel.
6. Fit the wheel (**Fig. 14 ref. 3**) with the inside of the rim towards the wheel balancer, until the wheel is up against the support flange (**Fig. 14 ref. 2**).



7. Fit the cone (**Fig. 15 ref. 3**) with the narrowest part turned towards the wheel.
8. Fit the pressure ring (**Fig. 15 ref. 1**) in the nut (**Fig. 15 ref. 2**) and fasten the cone (**Fig. 15 ref. 3**).





THE PRESSURE RING (FIG. 15 REF. 1) MUST BE MOUNTED WITH THE TEETH SIDE TOWARDS THE RING NUT (FIG. 15 REF. 2).

12.0 DISPLAY WITH KEYBOARD

The wheel balancers are equipped with a multifunction LCD display, equipped with a keyboard to interact/operate the controls present in graphical form on the same display.

On such display are displayed all the instructions for the correct wheel balancing, for example indicating where the operator shall fit adhesive or clip weights and the balancing mode and/or option used, as well as correct wheel rotation for inner/outer weights positioning.

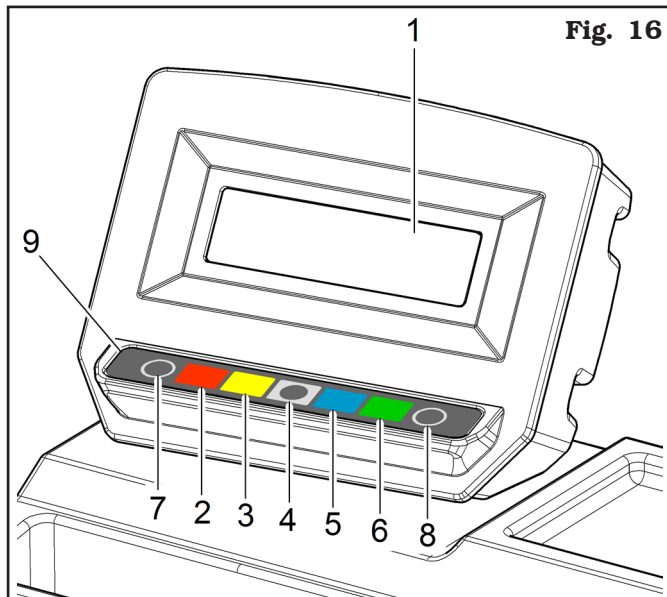


Fig. 16

KEY

- 1 - Display
- 2 - Function push button (red)
- 3 - Function push button (yellow)
- 4 - Function push button (grey)
- 5 - Function push button (blue)
- 6 - Function push button (green)
- 7 - Previous page push button
- 8 - Next page push button
- 9 - Push button panel (keyboard with 7 keys)

12.1 Brightness and contrast adjustment

From the first page of the program, by keeping the push button (B) (Fig. 17 ref. 3) pressed, push push button (F4) (Fig. 17 ref. 2) repeatedly in order to raise brightness/contrast or push push button (CENTR) (Fig. 17 ref. 1) repeatedly in order to lower brightness/contrast.

Try to find the best settings, going across the all steps, because the settings can pass through clear, dark and again clear.



THE ADJUSTMENT REMAINS ALSO AFTER MACHINE SHUT-DOWN.

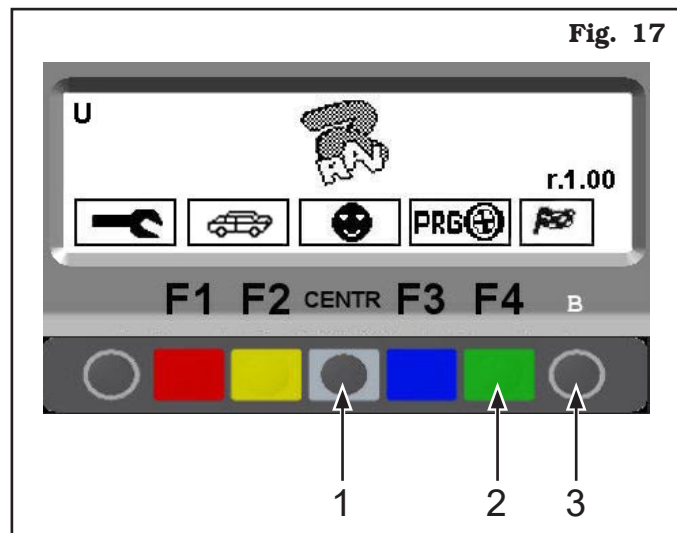
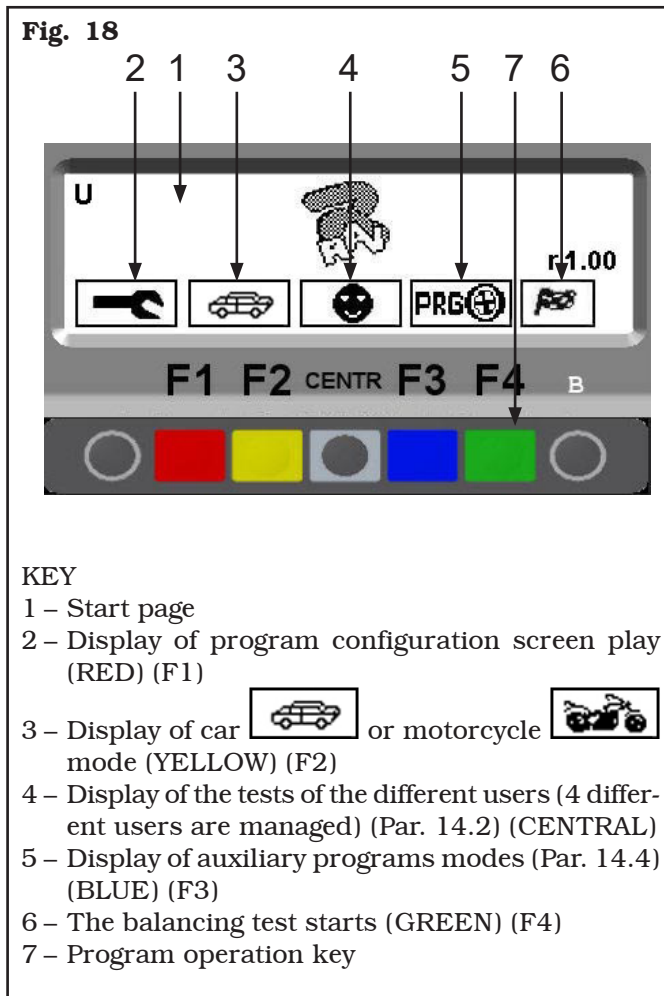


Fig. 17

13.0 SWITCHING THE MACHINE ON AND OFF

The ON/OFF master switch is located on the rear of the machine. To start the machine and access the program, switch on the system by turning the master switch. Wait a few seconds for the operating program to load and for the first program page to appear on the display screen (see **Fig. 18**).


The monitor shows various types of information and presents the user with numerous operation options.



By means of the keys of the operating keyboard (F1-F2-CENTR-F3-F4-B) all the machine functions can be used.

During program running, the various display pages show the different keys by means of which the corresponding function can be immediately selected.


Many display pages contain several rows of keys. In this case, the next row of keys can be displayed by

means of the key corresponding to the icon . To go back and display the previous row of keys, press

the key corresponding to the icon  or in some

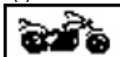
cases .

By pressing the “F2” key, the measurement mode can be changed from car to motorcycle and vice versa.


The symbol “” which appears on the screen on the first page indicates that the machine is in CAR


mode and the symbol  indicates MOTORCYCLE mode.


By using “CAR” mode  and “MOTORCYCLE”

mode  wheels can be balanced with a max static or dynamic unbalance of 300g.

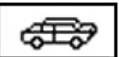
The indicated resolution is 5 g, however by pressing

“Centr” key  the unbalance can be displayed with a max resolution of 1 g.

In “CAR” mode  and “MOTORCYCLE” mode

 “MATCHING” procedure (Rim-tyre optimization; see Chapt. 18), SPLIT (see Chap. 16) and WEIGHTS HIDDEN BEHIND SPOKES MODE (see Chapt. 17) procedure can be performed.

ALL AUXILIARY functions (see Par. 14.4) can also be

selected in “CAR” mode  only.

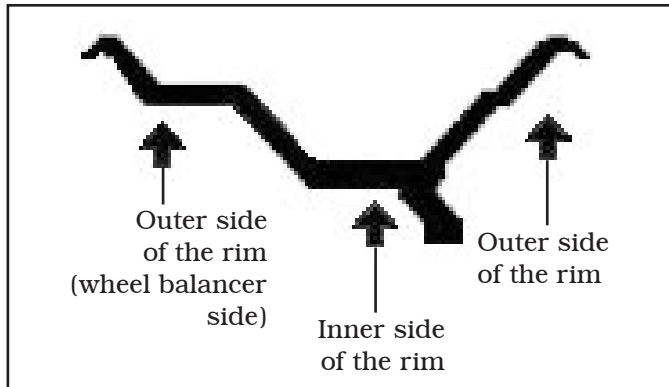


IN ORDER TO FIT CAR WHEELS ON THE BALANCER SHAFT, THE SPECIFIC CONES AND RING NUTS WILL BE REQUIRED SUPPLIED SEPARATELY AS ACCESSORIES.

14.0 WHEEL BALANCING



Symbols on display



14.1 Determination of wheel dimensions

14.1.1 Automatic wheel dimension setting (distance and diameter)

The wheel balancing machines can be featured with an automatic rod; a simple and precise method that permits automatically acquiring the distance from the machine and the wheel diameter at the weight fitting point. The rod itself permits correctly positioning the weights inside the wheel.

The value of rim distance from the machine is always set with a "mm" measurement unit.

The width and diameter values on the other hand can be set in "inches" or "mm"; in the examples in this manual "inches" are used.

The automatic rod, for storing the diameter and distance values, is started when it is removed from its initial position.

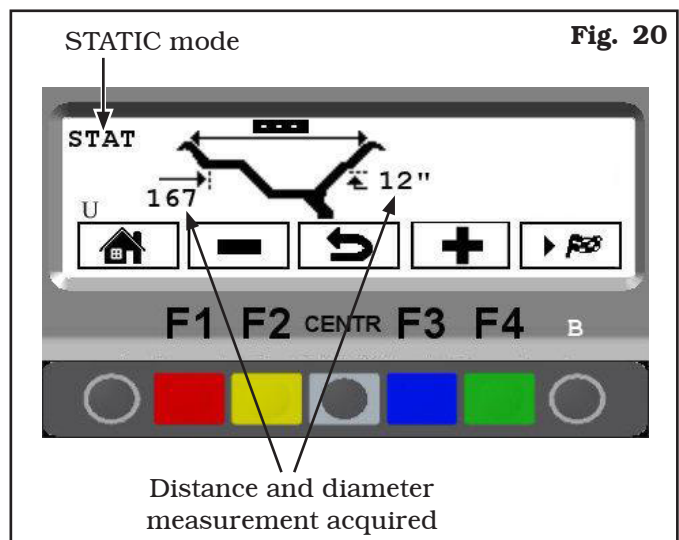
- **To make a measurement in DYNAMIC mode:**

Take out the automatic rod, the program goes directly from the start screen page to the screen page illustrated below (**Fig. 20**).

Move the automatic rod against the rim inner edge (**Fig. 19**) in measurement position, and maintain that position for a few seconds; measurement will be acquired when the detected value is displayed (static mode) (see **Fig. 20**).



Fig. 19



Distance and diameter measurement acquired

Enter the wheel width.

If the automatic external data gauge is not available, the operator has only to press "LESS" or

"MORE" keys until the desired width value is reached (see **Fig. 23**).

Input the nominal width shown on the rim, or manually check by using the graduated caliper, positioning it on the outer and inner side of the wheel as shown in **Fig. 21**. In this case, the measure must be set to be reduced to $\frac{1}{4}$ inch.

If on the other hand, the automatic external data gauge is available (optional), position the pointer of the measuring device against the outer edge of the rim (see **Fig. 22**). The measurement will have been acquired when the detected value is displayed (see **Fig. 23**).

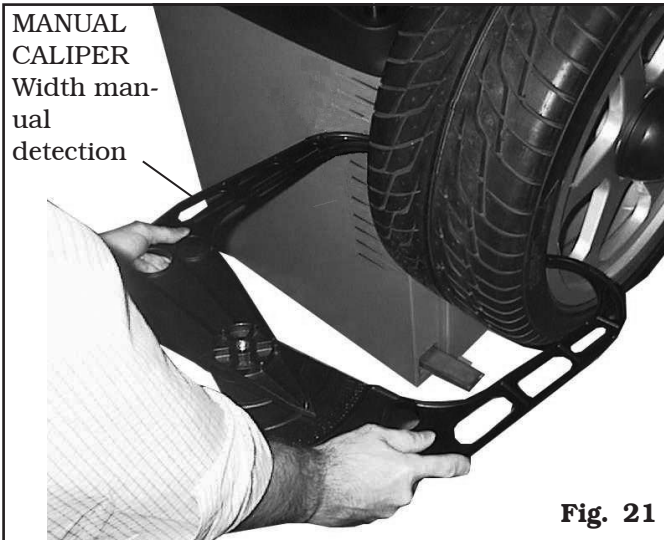


Fig. 21

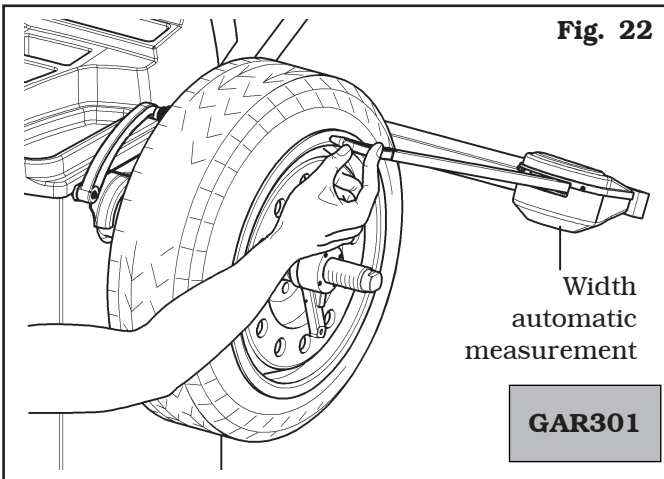
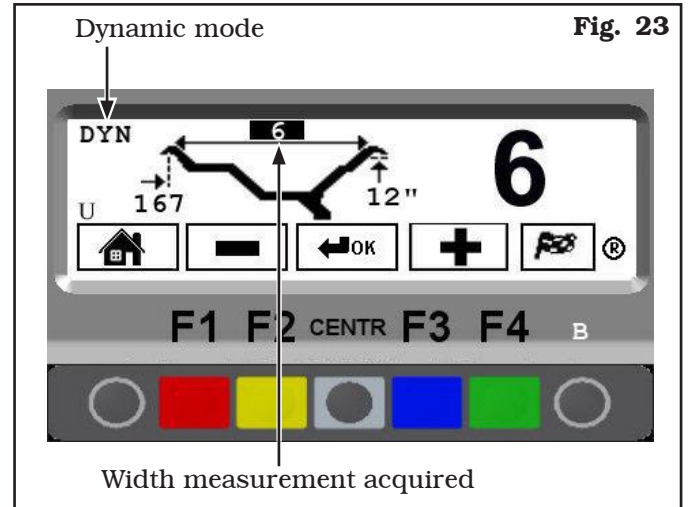


Fig. 22

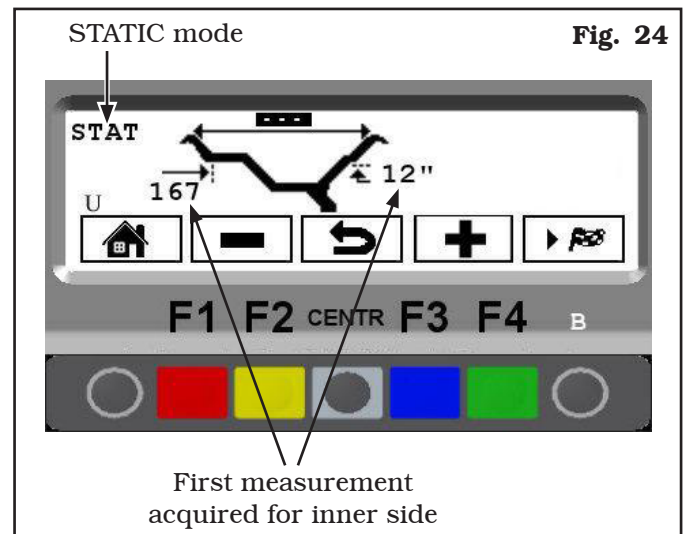
Once wheel width has been acquired, the program prepares for dynamic mode measuring (see **Fig. 23**)

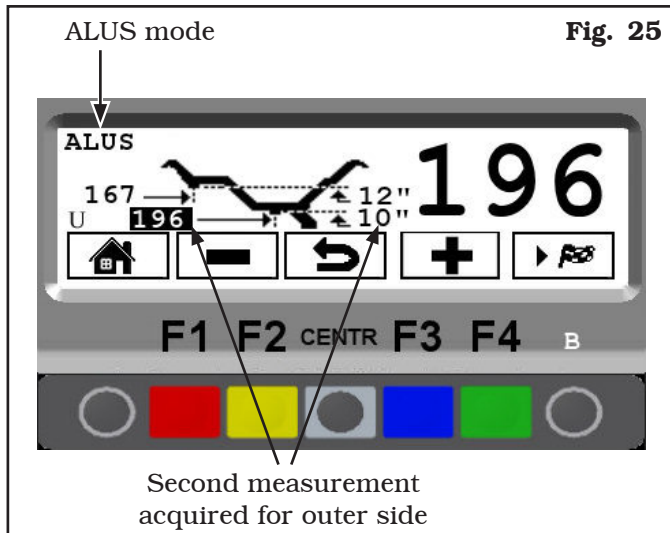


• **To measure in ALU-S and STATIC modes:**

Pull out the automatic rod and reach the position to be stored (see **Fig. 19**), maintain this for a few seconds. The indication of the acquired measurement for the first point is given by the display of the detected value (static mode, **Fig. 24**). Without moving the gauge back to initial position, further remove the automatic rod and reach the position to be stored for the second point. Remain still for a few seconds. The indication of the acquired measurement for the second point is given by the display of the detected value.

In this case, the width (the distance at which the weights are positioned) is stored automatically. This measurement can be changed manually (see Par. 15.1.2).



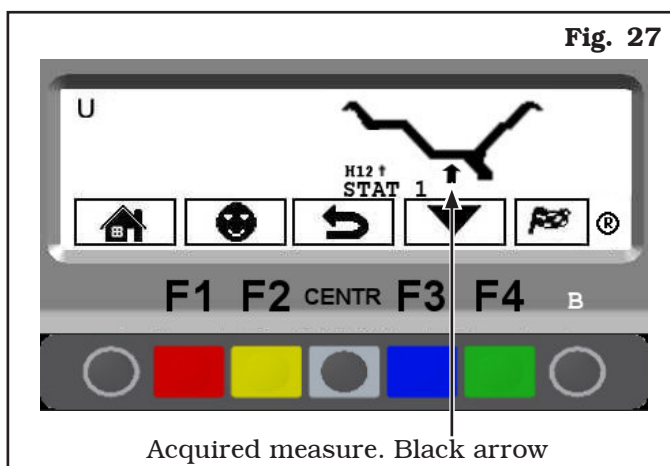
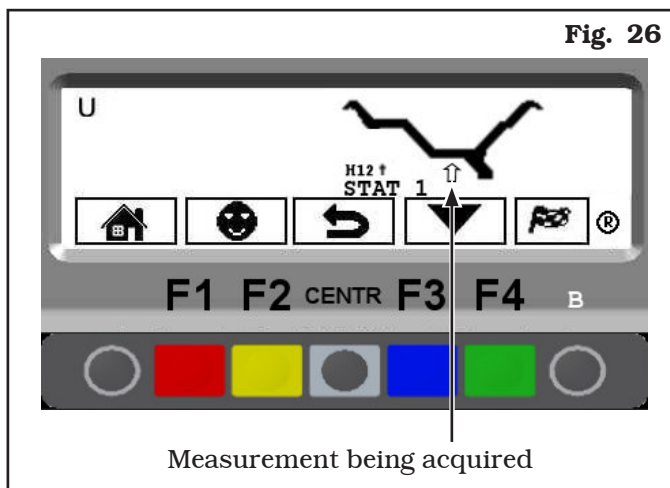


- To take a measurement in STAT 1 and STAT 2 modes:


Press “F2 key”  from the start screen page, choose the mode to be executed by pressing “F3 key”




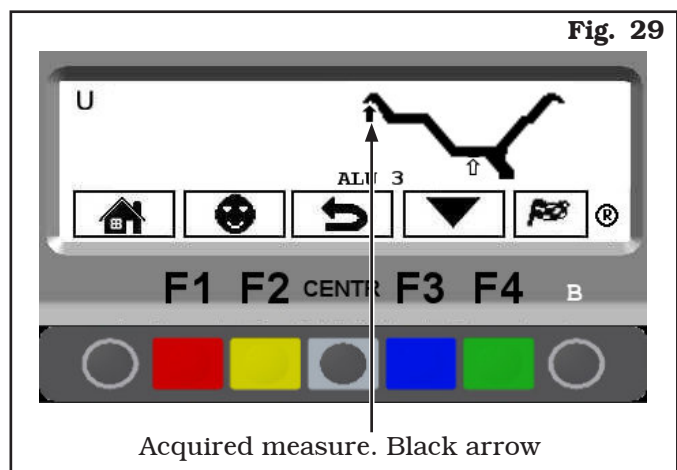
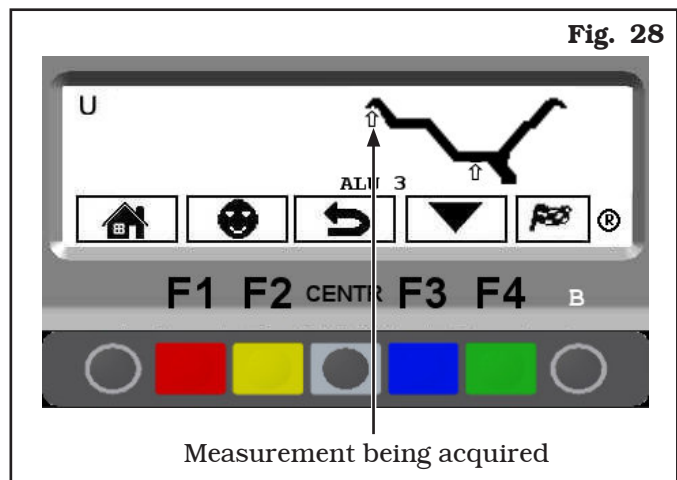
(e.g. STAT 1; **Fig. 26**). Remove the automatic rod and reach the position to be stored inside the rim. Maintain this position for a few seconds. Acquired measurement indication is given by the display of the black arrow.

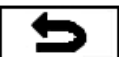
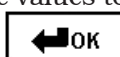




- To take a measurement in ALU1, ALU2, ALU3 and ALU4 modes:


Press “F2 key”  from the start screen page, choose the mode to be executed by pressing “F3

key”  (e.g. ALU 3; **Fig. 28**). Remove the automatic rod and reach the position to be stored. Maintain this position for a few seconds. Acquired measurement indication is given by the display of the black arrow. The second weight positioning point is calculated by the machine (inside the rim).



To change manually the entered values, the operator must press “CENTR key”  from **Fig. 29** to display the dimensions screen play with the values to be manually entered and press “centr key”  (see **Fig. 30**).

The operator must press “LESS”  or “MORE”  keys until the desired value is reached (see **Fig. 30**).

To confirm all the entered measurements, press “CENTR key” again . The program will show the screen page in **Fig. 31**.

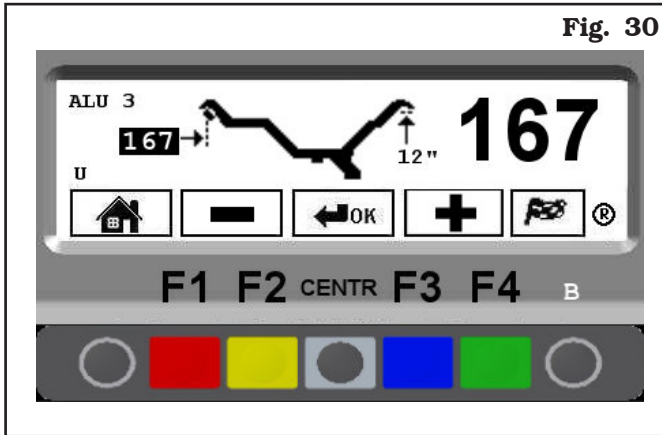


Fig. 30

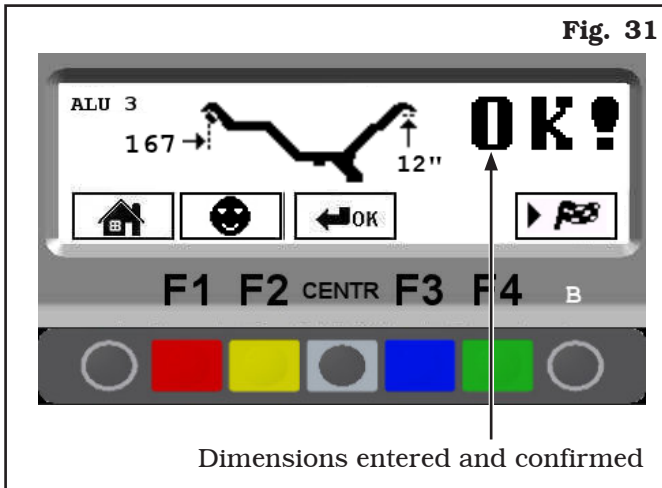


Fig. 31

Dimensions entered and confirmed

14.1.2 Manual setting of wheel dimensions for dynamic static and balancing functions


- To make a measurement in **STATIC mode**:

Valid for car/motorcycle

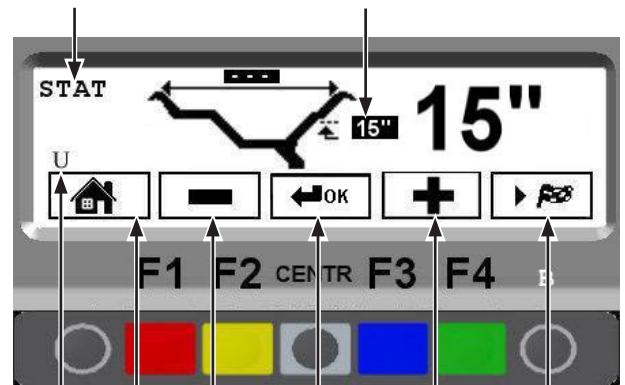
Wheel balancers feature a manual external data gauge and a manual distance caliper for determining wheel dimensions (**Fig. 33** and **Fig. 35**).

The dimension of the rim distance is always set with measurement unit “mm”.

The width and diameter values on the other hand can be set in “inches” or “mm”; in the examples in this manual “inches” are used. To change the unit of measurement from “inches” to “mm”, see Chap. 19.

Press “F3” , the program goes directly from the start screen page (**Fig. 18**) to the screen page illustrated below (STATIC mode, **Fig. 32**).


Selected program Rim diameter **Fig. 32**
STATIC mode




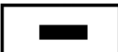

User N° 1 2 3 4 5
in use


KEY

- 1 – Return to previous screen page (RED) (F1)
- 2 – Decrease wheel dimension values (YELLOW) (F2)
- 3 – Select and confirm the value to be set (CENTRAL)
- 4 – increase wheel dimension values (BLUE) (F3)
- 5 – Performs spin (GREEN) (F4)

Press the central key () to select the value to set (only diameter) (**Fig. 32**).


The display screen will show the selected value on white bright background and on the right the same value in large characters (**Fig. 32**). Increase or decrease the measurements through the keys 

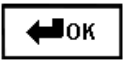
or . Press the central key () and



execute the spin by pressing “F4” key  (**Fig. 32**).

• To make a measurement in **DYNAMIC** mode:

Valid for car/motorcycle

Press "F3" , the program goes directly from the start screen page (**Fig. 18**) to the screen page illustrated in **Fig. 34** with no measurements (DYNAMIC mode).

Press the central key () to set manually the width.

The operator must press "LESS"  or "MORE"  keys until the desired value is reached (**Fig. 34**).

Input the nominal width shown on the rim, or manually check by using the graduated width gauge, positioning it on the outer and inner side of the wheel as shown in **Fig. 33**.



MANUAL EXTERNAL
DATA GAUGE
Rim width
manual detection

Fig. 33

Once wheel width has been input, the program prepares for dynamic mode measuring (**Fig. 34**).

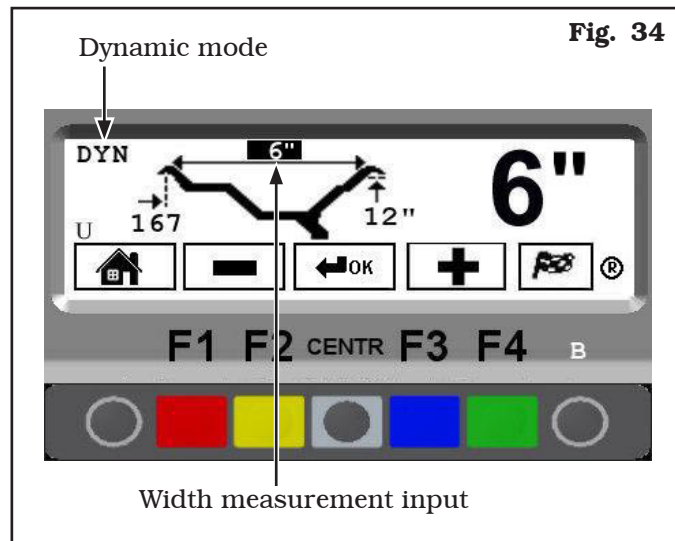
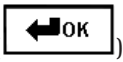


Fig. 34

Press the centre key () to select the rim diameter dimension.



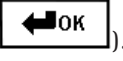


Enter the rim diameter by selecting the "PLUS"  or "MINUS"  key until the desired value is achieved. Press the central key (). The width is stored by selecting the "MINUS"  or "PLUS"  key until the desired value is achieved.



Fig. 35



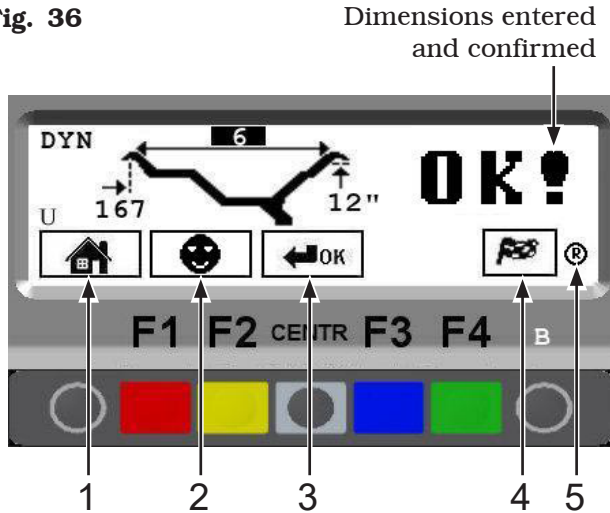
After setting all the wheel dimensions, press the centre key () again to confirm. The program will show the screen page in **Fig. 36**. Execute the spin by pressing "F4" key () (**Fig. 36**).

Fig. 36



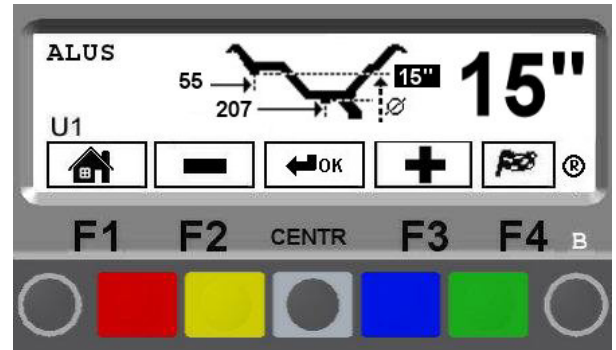
KEY



- 1 - Return to previous screen page (RED) (F1)
- 2 - User Control (Par. 14.2) (YELLOW) (F2)
- 3 - Select and confirm the value to be set (CENTRAL)
- 4 - Performs spin (GREEN) (F4)
- 5 - Function key used for recalculation program (Par. 14.5) (B)

14.1.3 Wheel dimension manual setting for ALU-S type correction and auxiliary programs

Select the ALU-S function as described in Par. 14.4 and press the "CENTRE key" to confirm and enter the measurements. The display will show the screen page in **Fig. 37**.

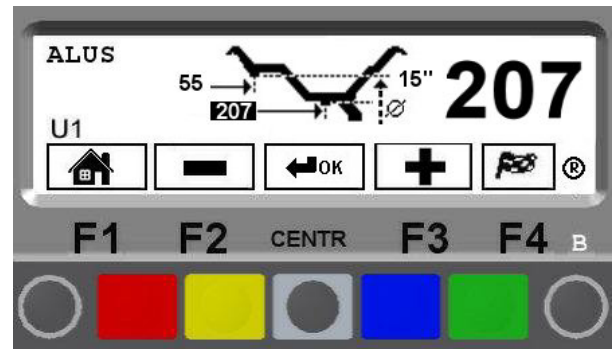
Fig. 37





Enter the wheel diameter (**Fig. 37**), by selecting the "MINUS" () or "PLUS" () key until the desired value is achieved.

Press the "CENTRE key" to confirm. The program will show the screen page in **Fig. 38**.

Fig. 38

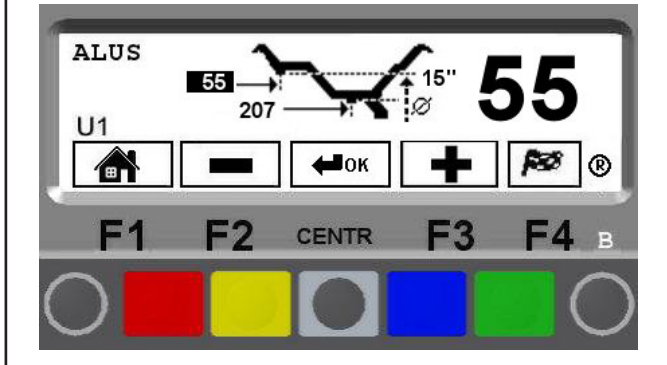


Move the manual distance caliper to the position where the inner weight is to be fitted. Read the value to be set on the scale. Enter the distance by selecting the "PLUS" () or "MINUS" () key until the desired value is achieved.

Press the "CENTRE key" to confirm. The display will show the screen page in **Fig. 39**.



Fig. 39



Move the manual distance caliper to the position where the outer weight is to be fitted (always hidden inside the rim). Read the value to be set on the scale.

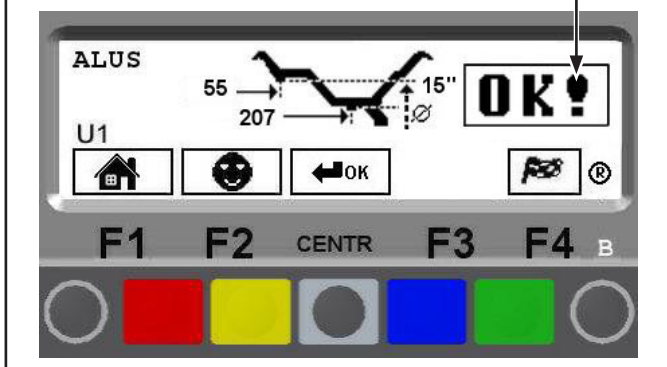
Enter the distance by selecting the "PLUS" 

or "MINUS"  key until the desired value is achieved. Press the "CENTRE key" to confirm.

The display will show the screen page in Fig. 40.

Fig. 40

Dimensions entered
and confirmed



To display all the entered measurements, press a few times "CENTR key".

Press the "F4 key" to start spin.

14.2 User control function

To select "User management", select the following key



"" on the presentation page (Par. 13).

Wheel balancers can be used by 4 different users at the same time, by selecting the above indicated key several times, until the desired user is reached.

When the user key is pressed, the current user number appears on the display screen (U1, U2, U3 and U4 in car mode or M1, M2, M3 and M4 in motorcycle mode).

The system stores the data relating to the last performed spin according to the different operators. The desired user can be called every time the program displays the specific key. The measurements stored for each user are lost when the machine is switched off.

User management is valid for any wheel balancer function.



TO ENABLE OR DISABLE "USER CONTROL" FUNCTION, SEE CHAP. 19. ONCE THIS FUNCTION HAS BEEN DISENGAGED ON THE PRESENTATION PAGE (CHAP. 13) ON THE TOP LEFT OF THE MONITOR, THE ONLY USED USER APPEARS "U" IN CAR MODE; OR "M" IN MOTORCYCLE MODE.

14.3 Unbalance measurement


14.3.1 Dynamic balancing

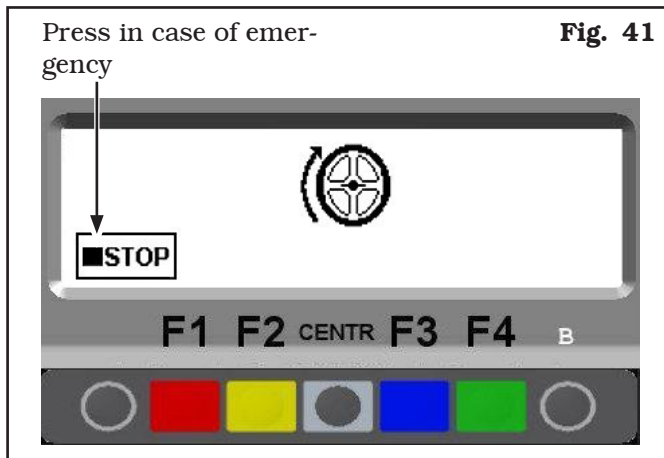
DYNAMIC balancing is a procedure that offsets the wheel vibrations using 2 weights on different planes. To perform a dynamic measurement spin:

- Make sure there are no stones and/or mud on the wheel.
- Remove any counterweights.
- Fit the wheel and make sure it is fastened properly.

Press the "F3 key"  from the initial program page (see Chap. 13).

Enter the wheel measurements (Par. 14.1), close the

protection guard, if on issue or press "F4"  to perform the wheel spin; in just a few seconds, the wheel runs at normal speed and the wheel balancer display shows wheel rotation (**Fig. 41**). After the spin, the wheel stops automatically, also taking into account the measured unbalance so that the fitting position of the outer weight is **exactly at 12 o' clock**.

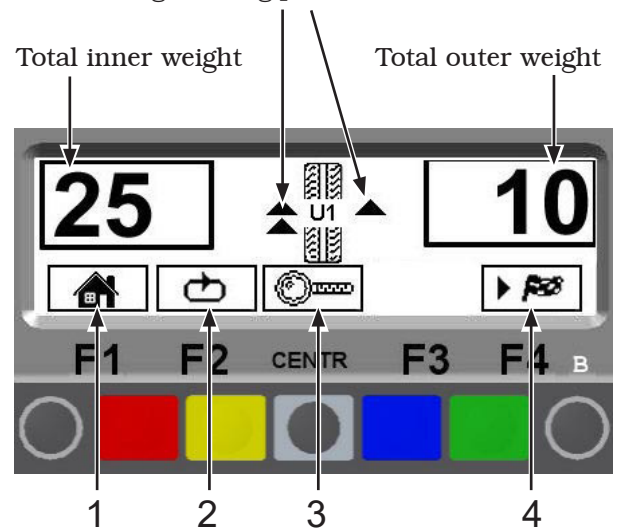


The display unit indicates the direction in which to move the wheel to fit the weights and how much weight is needed to correct the unbalance (**Fig. 42**). Weight can be determined in "grams" or "ounces"; in this manual examples are shown in grams. To change the unit of measurement from "grams" to "ounces", see Chap. 19.

Once the unbalance of the inside and outside of the wheel is known, it is possible to proceed with positioning for correction of unbalance (Par. 14.3.2).

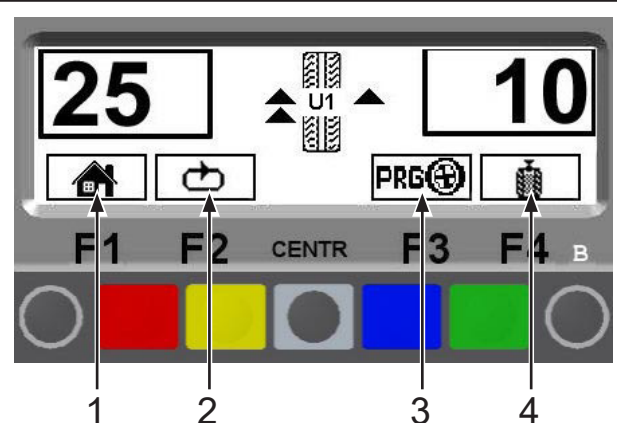
Arrows to help positioning in correction weight fitting point

Fig. 42



KEY

- 1 - Return to initial program phase (RED) (F1)
- 2 - Selected **once**: display of next row of keys (MATCHING function Chap. 18 - SPLIT Chap. 16)
- Selected **twice**: display of next row of keys (STATIC unbalance **Fig. 43**) (YELLOW) (F2)
- 3 - Displays exact unbalance (pitch 1 g instead of 5 g) (CENTRAL)
- 4 - Performs spin (GREEN) (F4) (if carter is missing) inner/outer side repositioning (if the carter option is activated)





KEY



- 1 - Return to DYNAMIC unbalance (**Fig. 42**) (RED) (F1)
- 2 - Display next row of keys (YELLOW) (F2)
- 3 - Display of programs modes
- 4 - Displays the STATIC unbalance (see Par. 14.3.3) (GREEN) (F4)

Fig. 43

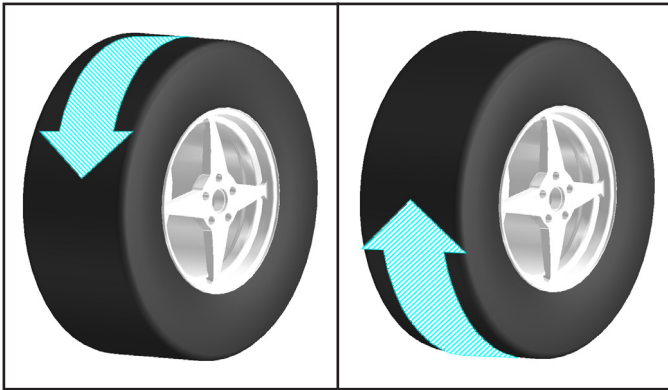
14.3.2 Wheel positioning



The weights must be positioned at the top part of the wheel, at 12 o' clock, so that the unbalance will be at the bottom and the weight fitting point will be at the top.

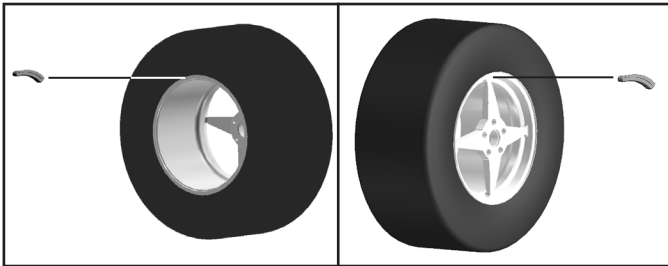
When the wheel balancer display screen shows  or  this means you are **very far** from the point where the counterweight is to be positioned.

Wheel position is over 30° from the exact fitting point. When the wheel balancer display screen shows  or  this means you are **not far** from the point where the counterweight is to be positioned.

Wheel position is within 30° from the exact fitting point.



When the wheel balancer display screen shows  (inner side) and  (outer side) the **exact position** has been reached for one side and for the other. The fitting point has been found. Now the unbalance can be corrected by fitting the necessary weight.



Once the wheel has been correctly positioned, fit the weight indicated by the machine on both sides of the wheel.

After the weights have been fitted, the wheel balancing conditions can be checked by performing a trial wheel spin.

The STANDARD unbalance calculation procedure is now completed.

14.3.3 Static balancing (STAT)

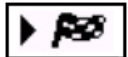
Make sure there are no stones and/or mud on the wheel.

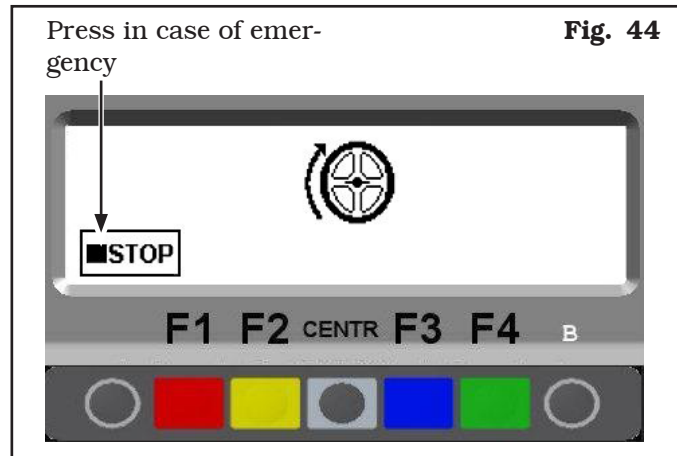
Remove any counterweights.

Fit the wheel and make sure it is fastened properly.

Press the "F3 key"  from the initial program page (see Chap. 13).

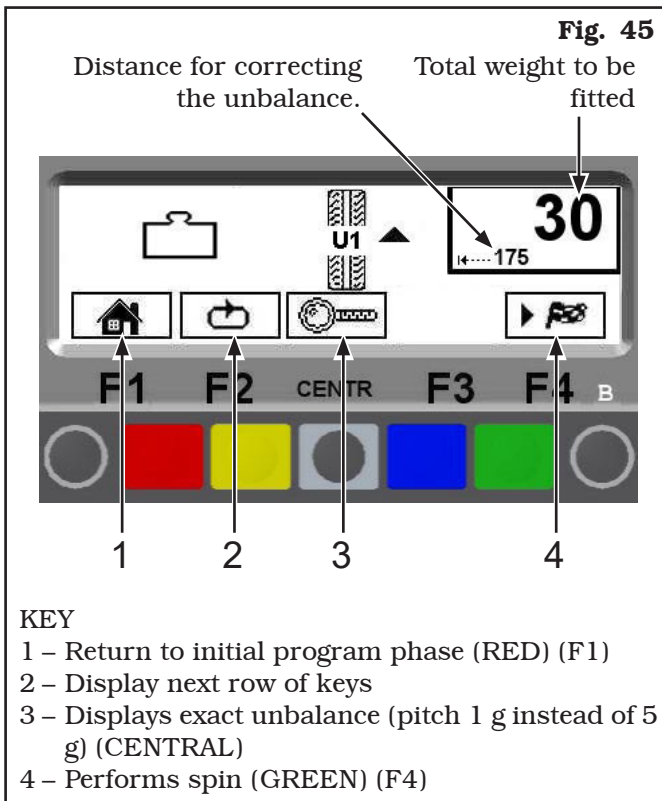
Enter the wheel measurements (Par. 14.1), close the

protection guard, if on issue or press "F4"  to perform the wheel spin; in just a few seconds, the wheel runs at normal speed and the wheel balancer display shows wheel rotation (**Fig. 44**). Do not touch the wheel while taking measurements. At the end of the spin, the wheel will stop automatically, taking into account the measured unbalance so the outer weight fitting position is at approx. 12 'o' clock.



The display unit indicates the direction in which to move the wheel to fit the weight and how much weight is needed to correct the unbalance.

The display screen shows the distance for correcting unbalance on small numbers. and the total weight to be fitted (**Fig. 45**) on big numbers. Once the unbalance value of the wheel side is known, the wheel can be positioned properly.



Fit the adhesive weight in the manual distance caliper as shown in **Fig. 46**.



Read the distance measurement on the manual distance caliper. Fit the adhesive weight on the outside of the wheel (**Fig. 47**) at the indicated distance (in the example at 175 mm) using a known weight (the example shows 30 g). The position of the outer weight is not visible but hidden inside.



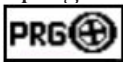
Check wheel balancing conditions by making a trial spin. The display screen will show an unbalance reset. The STATIC procedure is completed.

14.4 Measuring the unbalance with auxiliary programs



The available functions allow to select the appropriate weight positions to be placed in different positions compared to the standard ones (DYNAMIC unbalance). The ALU programs measure rims by means of pre-set data in the wheel balancer.

The measurements entered by the operator will therefore be automatically corrected by the machine according to the selected program.

From the program start page (see Chap. 13), press

"key F3" .

The monitor shows a window with possible selection modes. Select the desired function by means of keys

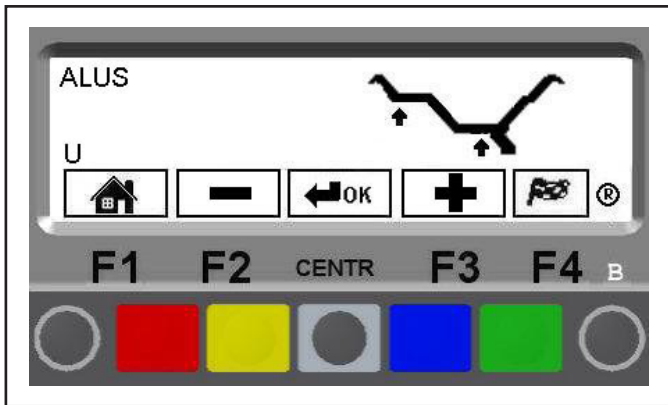
"F2"  and/or "F3" . Confirm the

selection by pressing "CENTR"  key and enter the measures required.

14.4.1 ALU-S

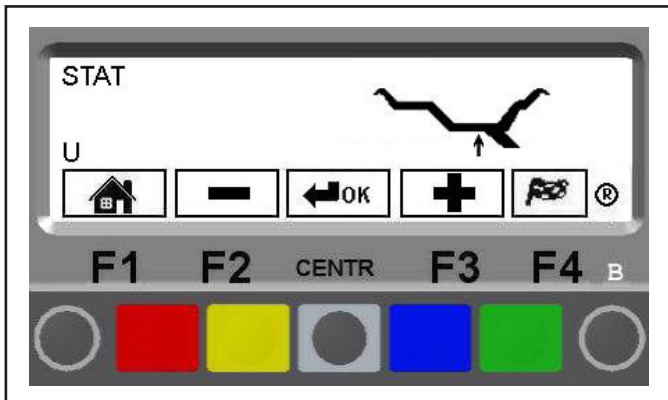
Valid for car/motorcycle

The ALU-S function enables the user to enter 2 different positions for fitting the adhesive weights on the outer and inner side of the rim, so as to select the position of the weights according to specific need. The position of the outer weight is not visible but hidden inside. Press the "CENTRE key" to confirm. Enter the measurements (par. 14.1.2) and proceed as described in par. 14.4.12.

**14.4.2 STATIC****Valid for car/motorcycle**

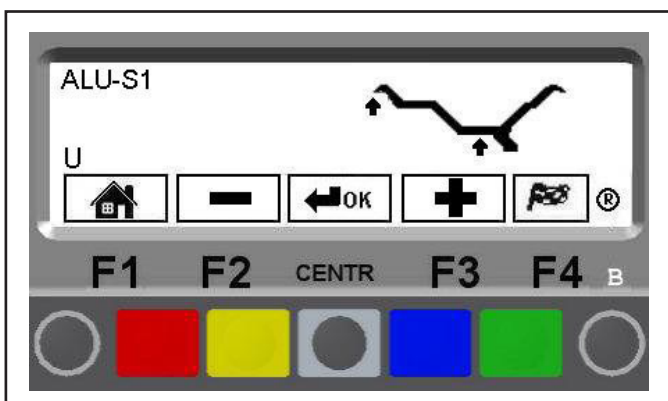
STATIC balancing is a procedure that offsets wheel vibrations using a single adhesive weight on a single plane.

Press the "CENTRE key" to confirm. Enter the measurements (par. 14.1.2) and proceed as described in par. 14.3.3.

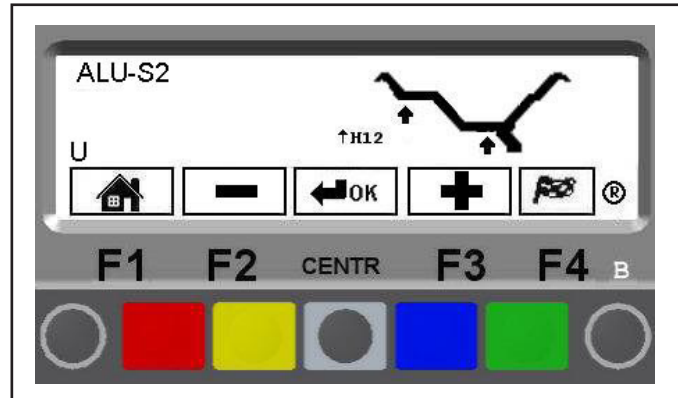
**14.4.3 ALU-S1****Valid for car**

ALU-S1 function permits balancing wheels with light alloy rims by fitting adhesive weights on the inner side and weight with clip on outer side of wheel.

Enter the measurements (par. 14.1.2) and proceed as described in par. 14.4.1 (the inner weight is with clip and at 12 o' clock).

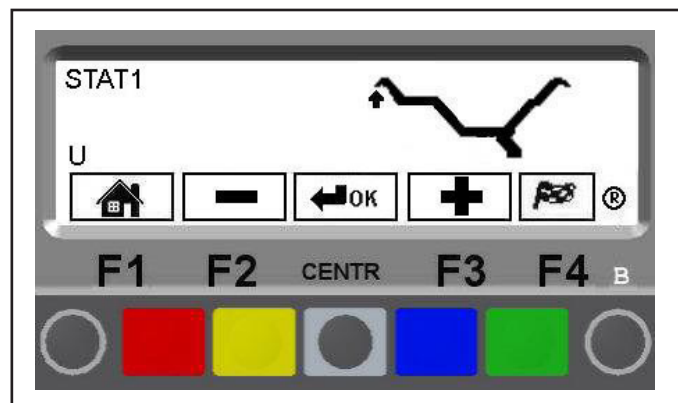
**14.4.4 ALU-S2****Valid for car**

ALU-S2 function allows the balancing of wheels with light alloy rims by fitting two adhesive weights on the outer and inner sides of the rim (the outer weight is at 12 o' clock). Enter the measurements (par. 14.1.2) and proceed as described in par. 14.4.12 (the inner weight is adhesive and at 12 o' clock).

**14.4.5 STATIC 1****Valid for car**

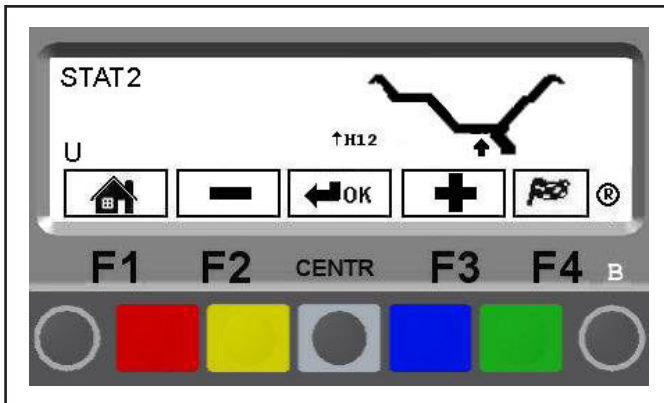
The STATIC 1 function is a procedure that offsets wheel vibrations using a single weight with clip on a single plane positioned exactly at 12 o' clock.

Enter the measurements (par. 14.1) and proceed as described in par. 14.3.1 (only for wheel inner side).

**14.4.6 STATIC 2****Valid for car/motorcycle**

The STATIC 2 function is a procedure that offsets wheel vibrations using a single adhesive weight on a single plane positioned exactly at 12 o' clock.

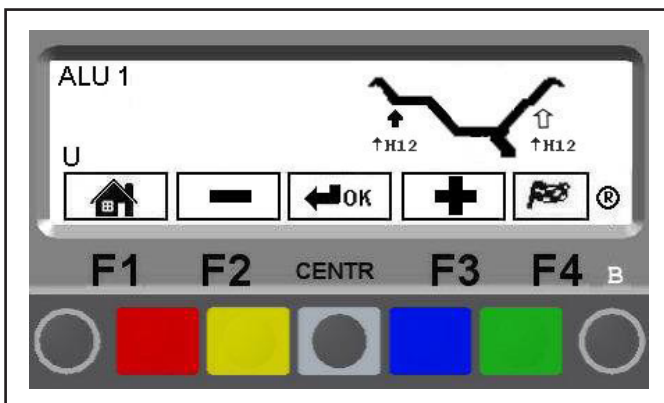
Enter the measurements (par. 14.1) and proceed as described in par. 14.3.1 (only for wheel inner side).



14.4.7 ALU 1

Valid for car

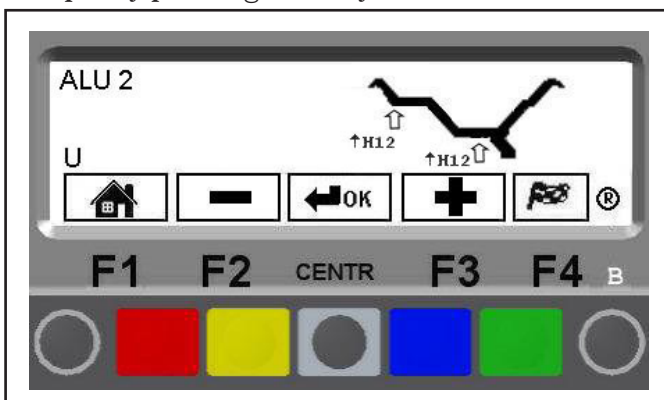
ALU 1 function permits balancing wheels with light alloy rims by fitting adhesive weights on the outer sides of the rim at 12 o' clock. Press the "CENTRE key" to confirm. Enter the measurements and proceed as described in par. 14.4.13.



14.4.8 ALU 2

Valid for car

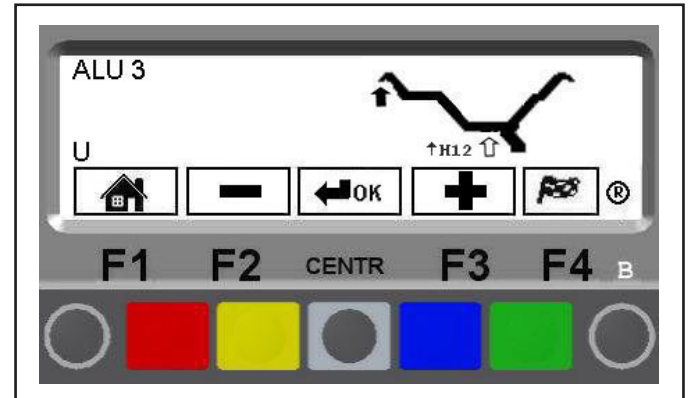
ALU 2 function balances wheels with light alloy rims by fitting adhesive weights on the outside and inside of the rim at 12 o' clock. The position of the inner weight is not visible but hidden inside. Press the "CENTRE key" to confirm. Enter the measurements and execute the spin by pressing "F4" key.



14.4.9 ALU 3

Valid for car

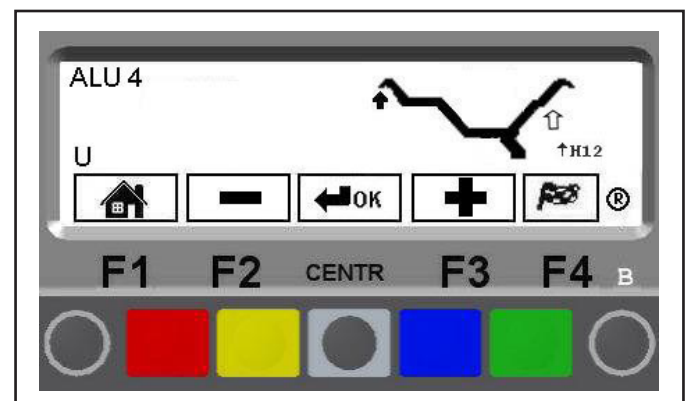
The ALU 3 function is a procedure that uses mixed weights to offset wheel unbalance: weight with clip on outer side of wheel, adhesive weight at 12 o'clock on inner side, not visible because inside the rim. Press the "CENTRE key" to confirm. Enter the measurements and proceed as for DYNAMIC unbalance.



14.4.10 ALU 4

Valid for car

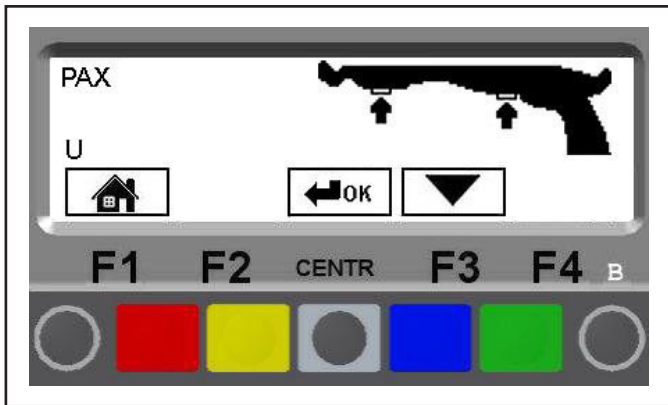
The ALU 4 function is a procedure that uses mixed weights to offset wheel unbalance: weight with clip on outer side of wheel, adhesive weight at 12 o'clock on inner side. Press the "CENTRE key" to confirm. Enter the measurements and proceed as for DYNAMIC unbalance.



14.4.11 PAX

Valid for car

PAX function is a procedure that permits balancing PAX wheels using adhesive weights at pre-set distances to offset wheel unbalance. Press the "CENTRE key" to confirm. Select the wheel type model and proceed as described in par. 14.4.14.



For ALU-S, STATIC and PAX functions, see relevant paragraphs. For all the other previously-indicated functions, wheel balancing will be done as indicated for dynamic balancing par. 14.3.1.

The wheel balancer will automatically correct the measurements entered by the operator according to the selected function.

14.4.12 ALU-S procedure

Valid for car/motorcycle



Make sure there are no stones and/or mud on the wheel. Remove any counterweights.

Fit the wheel and make sure it is fastened properly.

From the initial display page press the "F3 key"

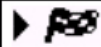


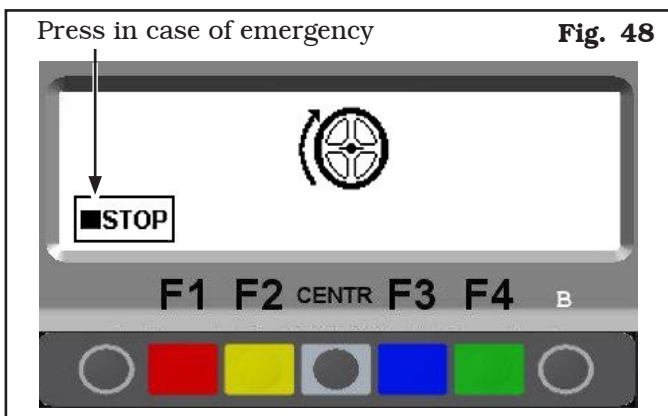
to select the type of desired correction.

Using the  and  key, display the ALU-S function and confirm with the "CENTRE key"



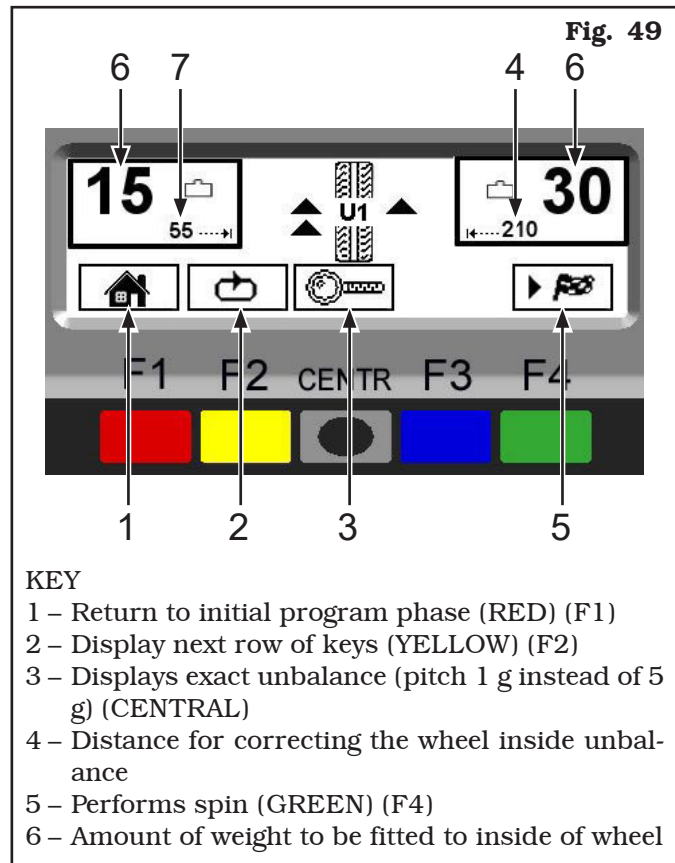
Enter the measurements as indicated in para. 14.1.2. After entering the measurements, close the guard, if

fitted, or press "F4"  to perform the wheel spin; in just a few seconds, the wheel runs at normal speed and the wheel balancer display shows wheel rotation (Fig. 48). Do not touch the wheel while taking measurements. At the end of the spin, the wheel will stop automatically, taking into account the measured unbalance so the outer weight fitting position is at approx. 12 o'clock.



The display unit indicates the direction in which to move the wheel to fit the weights and how much weight and distance are needed to correct the unbalance (Fig. 49).

Once the unbalance value of the inner and outer wheel side is known, the wheel can be positioned properly. Turn the wheel in the direction indicated by the arrows (on the outer side, approximately at 12 o'clock) until the correct position is reached (par. 14.3.2).



Fit the adhesive weight in the manual distance caliper as shown in Fig. 50.



Read the outer distance measurement on the manual distance caliper. Fit the adhesive weight on the outside of the wheel (**Fig. 51**) at the indicated distance (in the example at 210 mm) using a known weight (the example 30 g). The position of the outer weight is not visible but hidden inside. Turn the wheel until the correct point is reached (par. 14.3.2).



Fig. 51

Read the inner distance measurement on the manual distance caliper. Fit the adhesive weight on the inside of the wheel (**Fig. 51**) at the indicated distance (in the example at 55 mm) using a known weight (the example 15 g). Turn the wheel until the correct point is reached (par. 14.3.2). Check wheel balancing conditions by making a trial spin. The display screen will show an unbalance reset.

If the adhesive weight has to be hidden behind spokes, refer to “weights hidden behind spokes mode” in Chapt. 17.

The ALU-S procedure is completed.



14.4.13 ALU 1 procedure

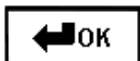
Valid for car

Make sure there are no stones and/or mud on the wheel. Remove any counterweights. Fit the wheel and make sure it is properly fastened (Chap. 13). From the first display page (Chap. 13) press the “F3 key”




to select the type of desired correction.

Through the keys  or  display the ALU 1 function. Confirm the selection with the “CENTR”



key. Determine the wheel dimensions using the specific manual distance caliper (par. 14.1). After entering the data, close the protection guard, if

fitted, or press “F4”  to perform the wheel spin; in just a few seconds, the wheel runs at normal speed and the wheel balancer display shows wheel rotation (**Fig. 52**). Do not touch the wheel while taking measurements. At the end of the spin the wheel will

stop automatically, also taking into account the measured unbalance so the external weight fitting point is exactly at 12 o' clock.

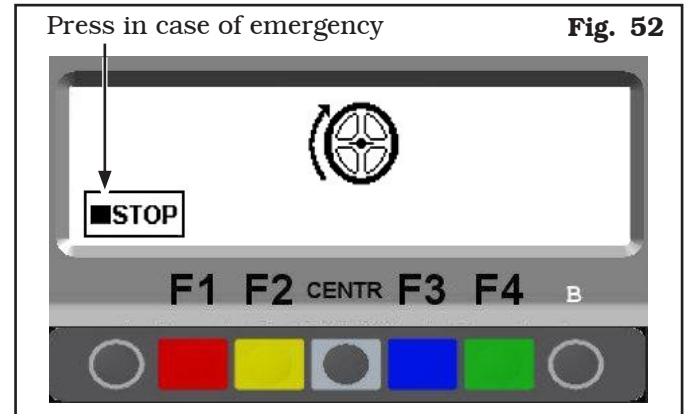


Fig. 52

The display screen shows the weight required to correct the unbalance (**Fig. 53**).

Turn the wheel at the point indicated by the arrows, until the correct position has been reached to correct the unbalance (par. 14.3.2).

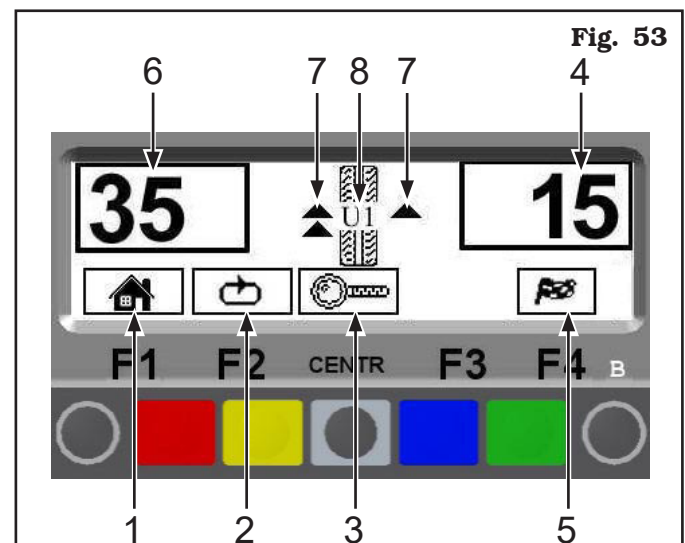


Fig. 53

KEY

- 1 – Return to initial program phase (RED) (F1)
- 2 – Display next row of keys (MATCHING PROCEDURE) (YELLOW) (F2)
- 3 – Displays exact unbalance (pitch 1 g instead of 5 g) (CENTRAL)
- 4 – Total outer weight
- 5 – Performs spin (GREEN) (F4)
- 6 – Total inner weight
- 7 – Arrows to help positioning manually the wheel (see Par. 14.3.2) in correction weight fitting point
- 8 – N° of current user

Fit the adhesive weight on wheel outer side. The outer side weight must be positioned **by hand on the vertical** (Fig. 54).



Fig. 54

To fit the adhesive weight on the inner part of the wheel, turn the wheel in the direction of the arrows until the correct position is reached (the arrow must be horizontal).

The adhesive weight on the inner side of the wheel. The inner side weight must be positioned **by hand high up on the vertical at 12 o'clock** (Fig. 54), using a weight of pre-determined value (the example in Fig. 53 shows 35 g).

Check the wheel balancing conditions and make a trial spin.

The ALU 1 procedure is completed.


14.4.14 PAX mode



Valid for car

Make sure there are no stones and/or mud on the wheel.

Remove any counterweights.

Fit the wheel and make sure it is properly fastened (Chap. 13.0).

From the first display page (Chap. 13.0) press the "F3 key"  to select the type of desired correction.

Through the keys  or  display PAX function. Confirm the selection by pressing the

"CENTR"  key.

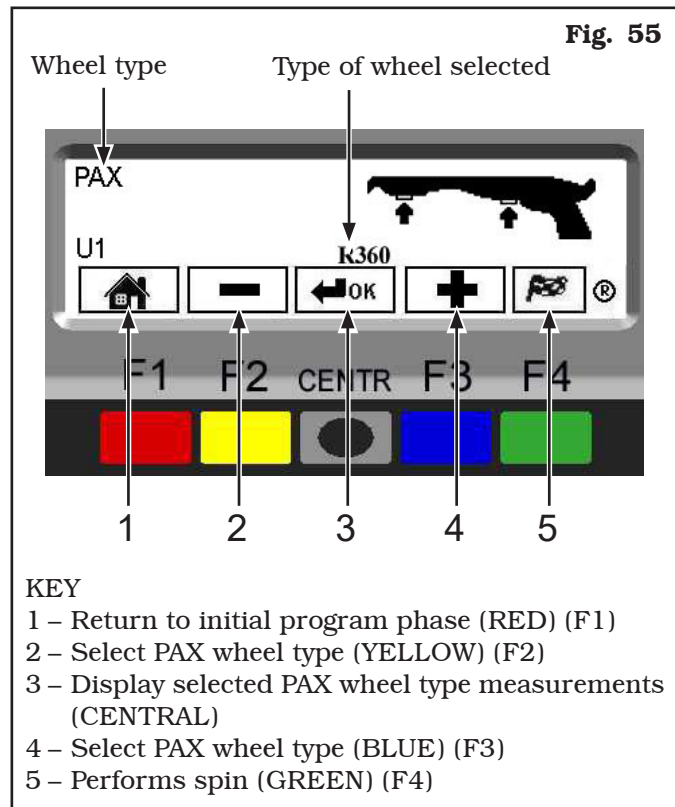

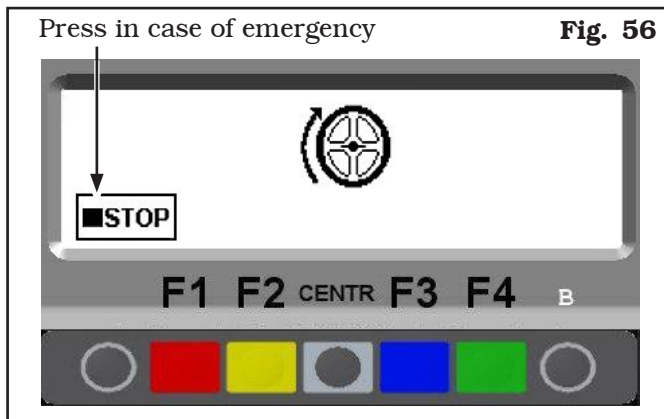


Fig. 55

Press the "F4 key"  to perform a spin. In just a few seconds, the wheel will run at full speed; the wheel balancer display indicates the wheel rotation (Fig. 56). After the spin, the wheel stops automatically, taking into account the measured unbalance so that the fitting position of the outer weight is around at 12 o' clock.







Proceed to fit the weight as shown for the ALU-S mode (Par. 14.4.12).

14.5 Recalculation Function


After making a spin, the wheel automatically stops, and the required weight/s and its/their position is/are always indicated.

If a test is performed in DYNAMIC, ALU-S, or STATIC mode, the data of the other modes can be obtained without making another spin by simply setting other

dimensions and pressing the "Recalculation key" .

From the page where the results are shown (see for example, **Fig. 42**), press "F2"  key until displaying the  key. Press  and select the wished program.

At this point, simply set the dimensions again, in ALU-S, STATIC or again DYNAMIC mode, as explained in

Par. 14.1, and press key "Recalculation" .

The screen will show a new page with weights and position, in the new ALU-S, STATIC or DYNAMIC modes, taking into account the new dimensions.

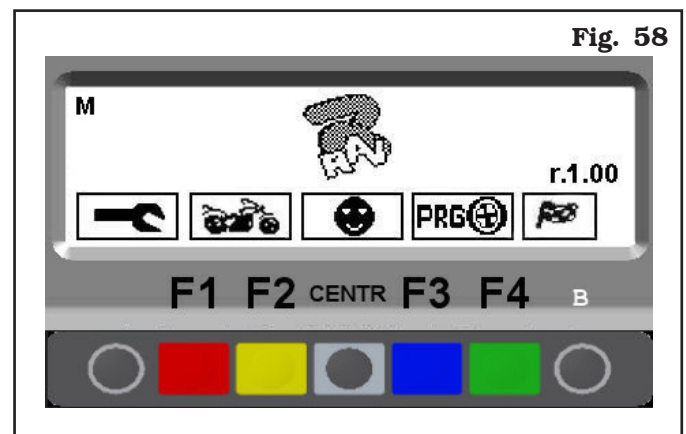
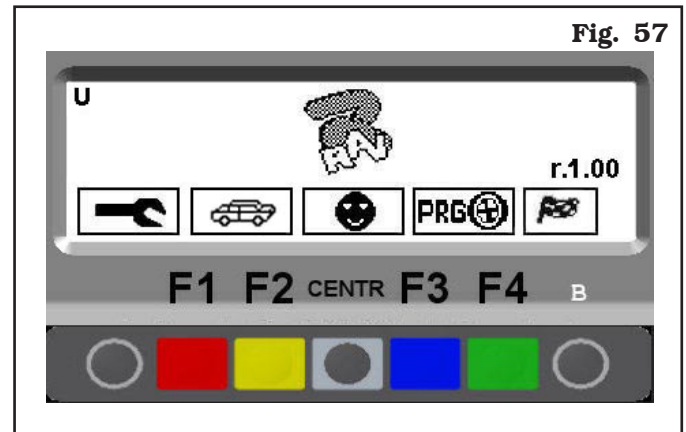
No new spin has to be made because the machine continues to store the data of the previous spin.

Similarly, new weight and position data can be obtained by switching from an "Auxiliary Programs" mode (see Par. 14.4) to another mode (ALU-S1 - ALU-S2 - STATIC1 - STATIC2 - ALU1 - ALU2 - ALU3 - ALU4 - PAX) without making another spin.

15.0 WHEEL BALANCING IN MOTORCYCLE MODE

By enabling the "Motorbike wheel balancing" function (see **Fig. 84**) the wheel balancers can also balance motorbike wheels.

From the opening page, press the "F2 key" to select car (**Fig. 57**) or motorcycle (**Fig. 58**) balancing mode.

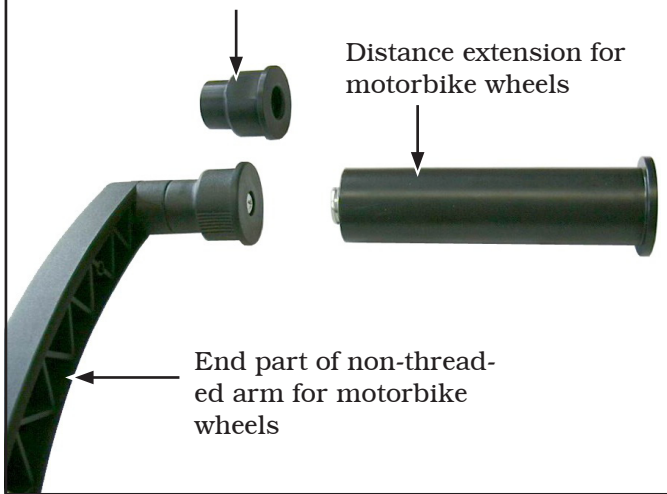


"Motorcycle" mode automatically recalculates wheel distance measurement, increasing it by the length of GAR181A1 optional extension.

To fit the distance extension, the old non-threaded end part of the arm must be removed and the threaded one fitted (see **Fig. 59**). The extension has to be screwed up only when balancing is performed in "Motorbike" mode.

End section of distance threaded
arm for motorbike wheels

Fig. 59



16.0 SPLIT PROCEDURE

Valid for car/motorcycle

The SPLIT procedure proves useful when the DYNAMIC unbalance (par. 14.3.1) of a wheel is fairly high and the weight to be fitted is not available, for instance a 100 g weight. It's possible then to correct the unbalance dividing the amount of weight into two weights of smaller size.

The SPLIT procedure eliminates errors caused by manually fitting two 50 g weights close to one another, which could leave considerable outstanding unbalance.

For example:

100 g WEIGHT
TO BE FITTED TO CORRECT
UNBALANCE



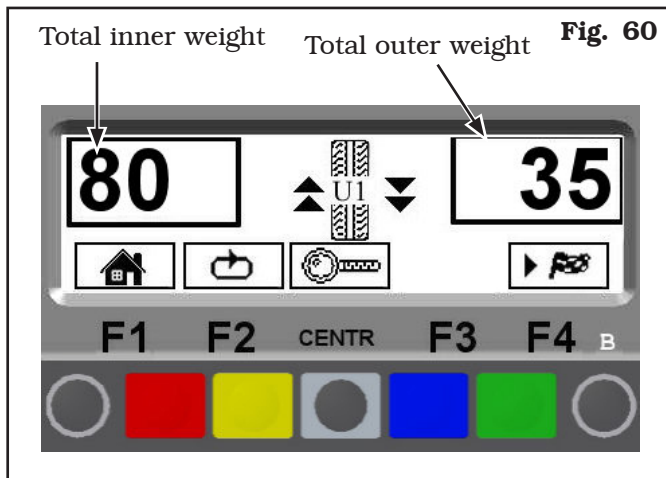
TWO SMALLER WEIGHTS (50 g)
FITTED MANUALLY




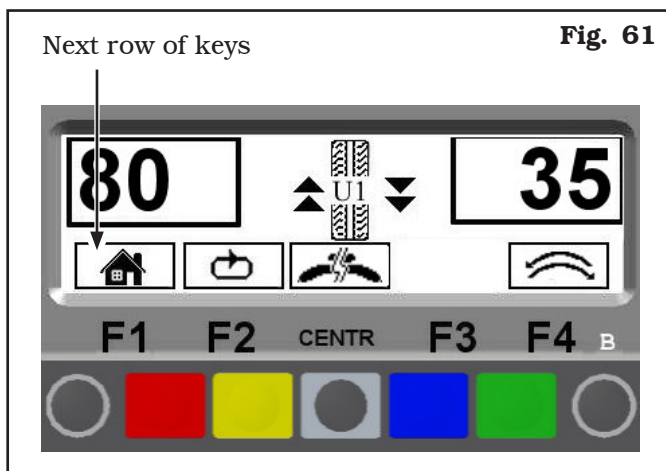
TWO SMALLER WEIGHTS (55 g)
USING SPLIT PROCEDURE




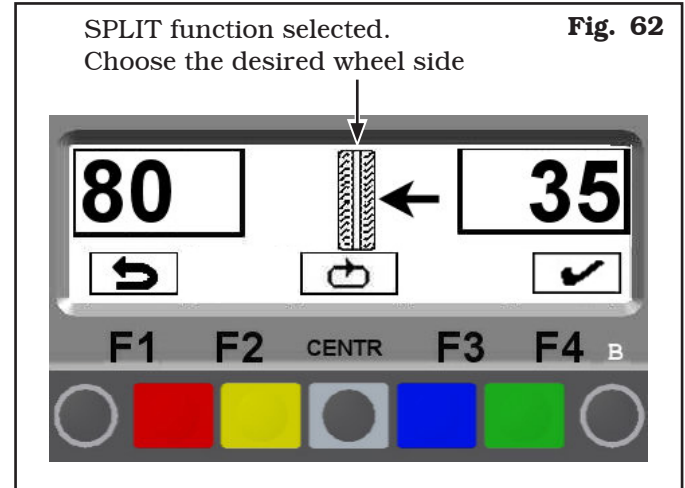
Proceed to DYNAMIC unbalance measurement displaying by performing a standard wheel spin (par. 14.3.1). Once the unbalance values have been detected (Fig. 60):




Press "key F2" corresponding to icon . The display screen will show another row of keys (Fig. 61).



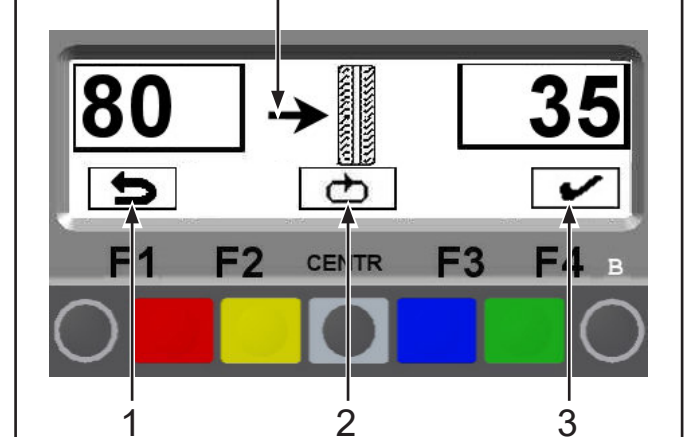
Press the key relating to the SPLIT function , the system will display the screen page in Fig. 62.



Press "CENTR key" corresponding to icon , to select the desired wheel side (outer or inner). Depending on the selected side, the monitor will show the position of the direction arrows.

Press "key F4"  to confirm.



Confirm the wheel side. In the example, the selected side is the inner; where the total weight is higher

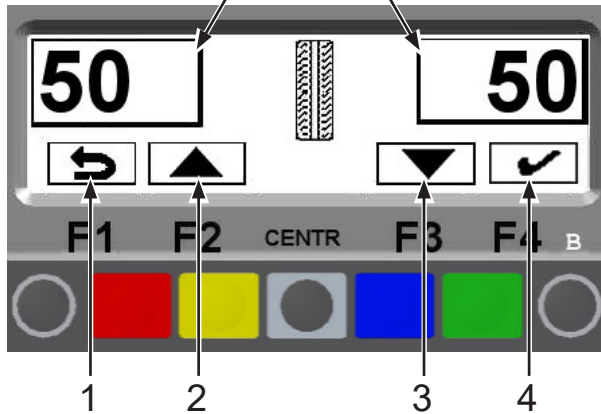


KEY

- 1 - Display of program previous page (RED) (F1)
- 2 - Selects wheel side (outer or inner) (CENTRAL)
- 3 - Confirms selection and continues (GREEN)(F4)

At this point, the system will display the quantity of the two weights to be fitted on the wheel (see Fig. 64).

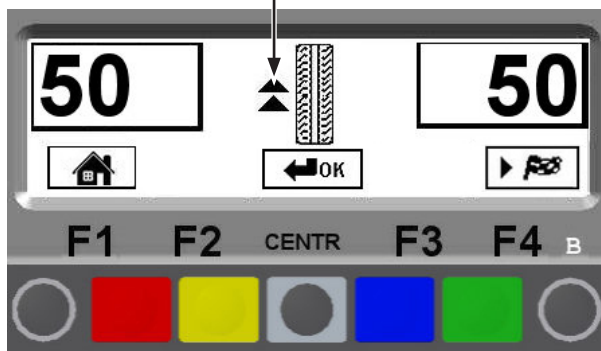
Using the keys corresponding to icons  and , the operator can increase or decrease the quantity of the weights in the awareness that, the bigger the weights, the bigger the distance will automatically be between them.

Choose the weights to be fitted and confirm **Fig. 64**

KEY

- 1 - Display of program previous page (RED) (F1)
- 2 - The weight to be fitted increases (YELLOW) (F2)
- 3 - The weight to be fitted decreases (BLUE) (F3)
- 4 - Confirms selection and continues (GREEN) (F4)


Turn the wheel at the point indicated by the arrows, until the correct position has been reached to correct the unbalance (par. 14.3.2).

Arrows to help positioning in correction weight fitting point **Fig. 65**

The monitor again displays **Fig. 65**. Turn wheel at the point indicated by the direction arrows, and fit the SECOND weight.

The inner side operation is complete, press "CENTR" key to quit.

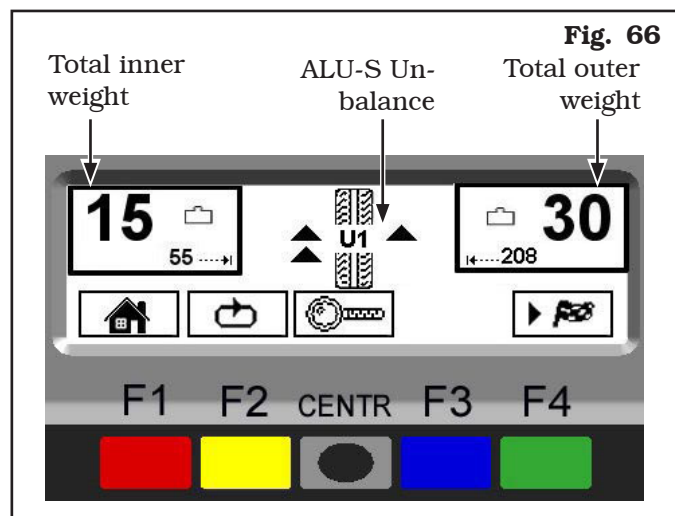
Press "CENTRAL" key again and the key related to

SPLIT function  (to perform the same operation for the outer side of the wheel) or fit the outer weight on the top part of the wheel, at 12 o'clock.


17.0 WEIGHTS HIDDEN BEHIND SPOKES MODE**Valid for car/motorcycle**

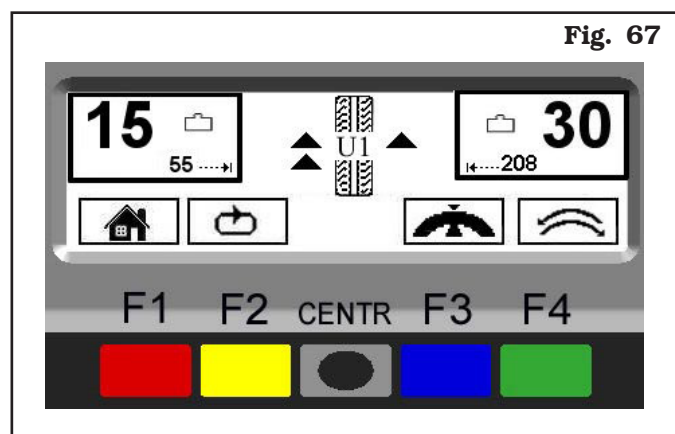
Adhesive correction weight positioning may not look attractive on some types of rims. In this case, "weights hidden behind spokes" mode can be used: it splits any correction weight on the outer side into two parts to be hidden behind rim spokes. It can be used in ALU-S Static mode.


Proceed to display the ALU-S unbalance measurements by performing a spin (**Fig. 66**).



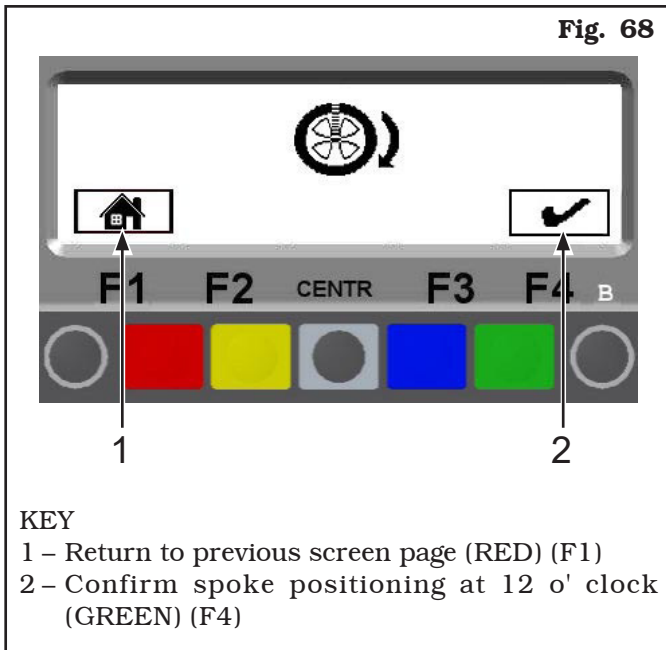
Once the unbalance values have been determined,

press the "F2 key" . At this point, the next row of keys is displayed on the monitor.



Press the "F3 key" relating to the weights hidden behind spokes mode . The program will display the screen page in **Fig. 68**.

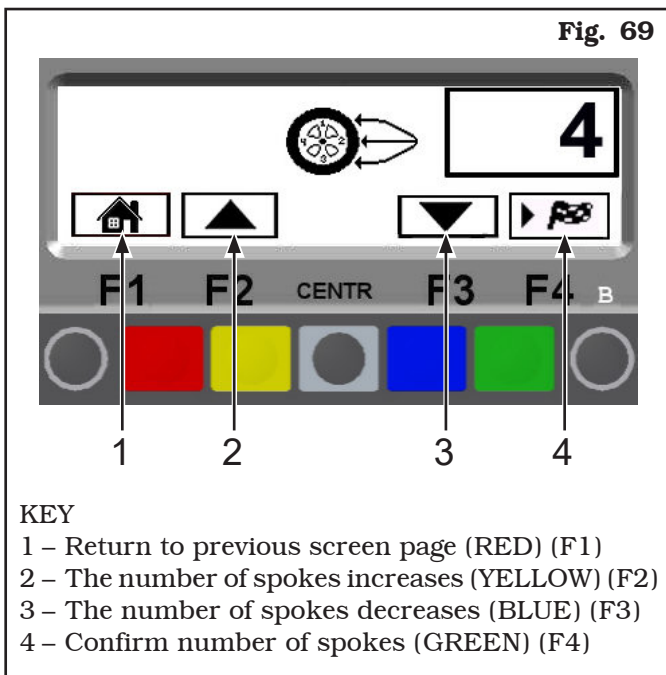
Move any spoke up to 12 o'clock (in many cases, the position could already be behind or near one of the spokes) and press the "F4 key" to confirm and continue.



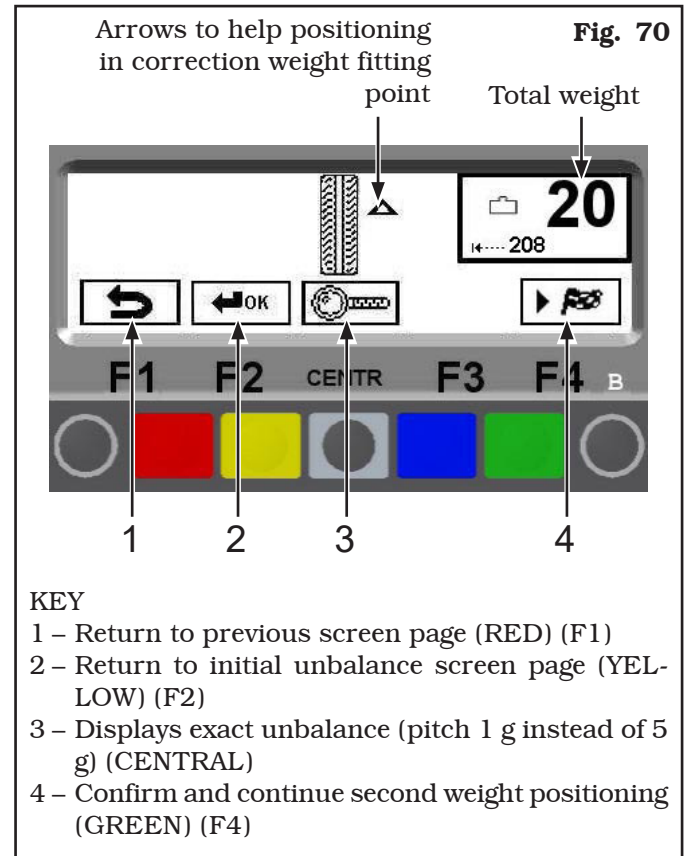
Enter the number of spokes existing on the wheel, using keys F2 and F3 (**Fig. 69**).

A minimum of 3 spokes and a maximum of 12 can be entered.

Press the "F4 key" to confirm and continue.



The machine automatically calculates weight position in two positions hidden behind the spokes.

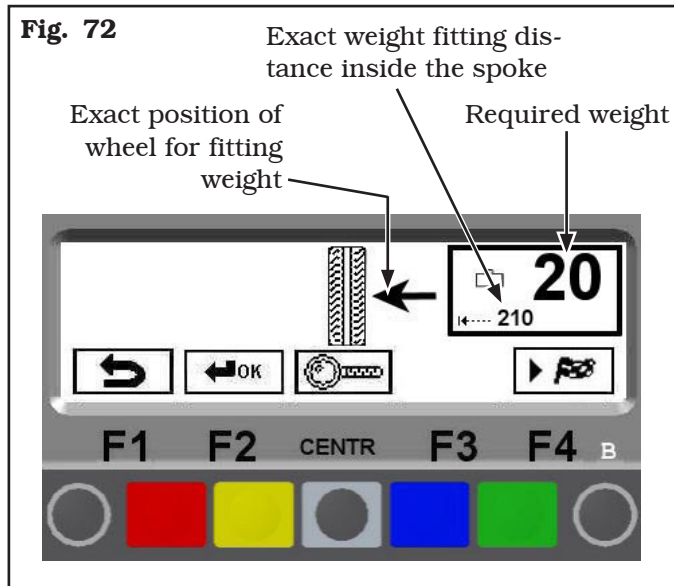


Correctly position the wheel (see Par. 14.3.2) and lock it

Fit the adhesive weight (in the example this is 20g) in the manual distance caliper as shown in **Fig. 71**.



Fit the adhesive weight inside the spoke at the point indicated on the display screen in **Fig. 72**.



Correctly position the wheel (see Par. 14.3.2) and lock it and fit the second adhesive weight in the manual distance caliper as shown in **Fig. 71**.

Fit the adhesive weight inside the spoke at the point indicated on the display screen in (**Fig. 72**).

Press the "F4 key" to confirm positioning of second weight behind the spoke.

The system displays the initial unbalance situation before performing the SPOKES procedure.

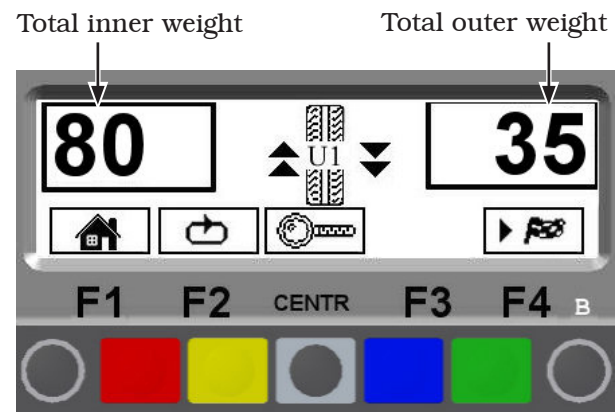
18.0 MATCHING PROCEDURE (Rim - Tyre Optimization)

Valid for car/motorcycle

The Matching procedure offsets strong unbalance, reducing the weight quantity to be fitted on the wheel to achieve balancing. This procedure permits reducing unbalance as much as possible by offsetting the tyre unbalance with that of the rim.

After displaying any unbalance measurement (see example in **Fig. 73**).

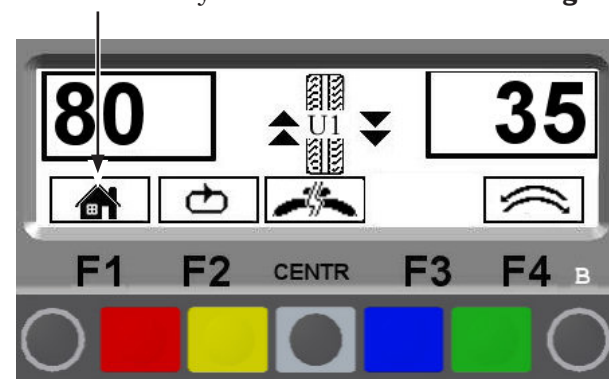
Fig. 73



Once detected the unbalance measurements, press the F2 key corresponding to the icon . The monitor will show a new key sequence.

Next row of keys

Fig. 74



Press the key relating to the MATCHING (*) function, the system will display the screen page in **Fig. 75**.

(*): the MATCHING operation can only be performed if the static unbalance is > of 30 g. If it is less than this, the key relating to this operation is not displayed.

Make a reference mark, using chalk for instance, of the position of the rim and tyre, remaining in line with the arrow on the flange, so as to be able to fit the rim back on in the same position on the machine.

Make a reference mark on the rim and tyre, in line with the arrow on the flange

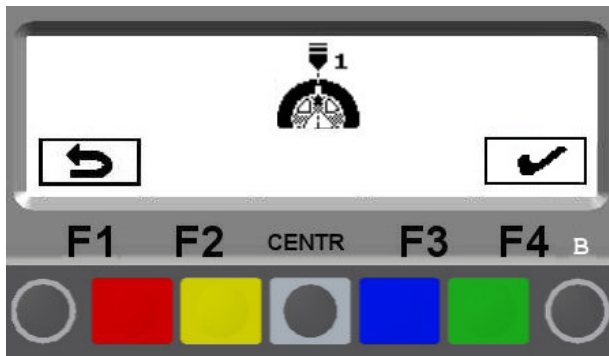
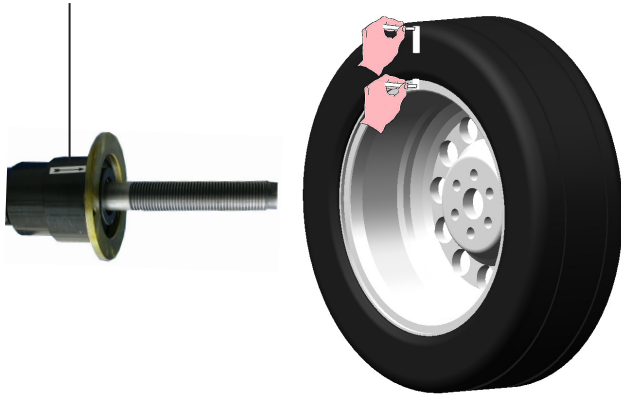


Fig. 75

Remove the wheel from the wheel balancer. Remove the tyre and turn it on the rim through 180°.

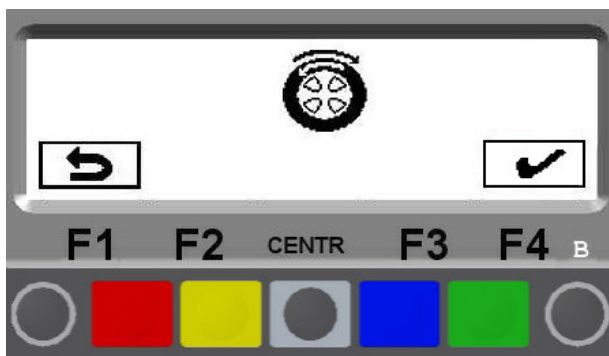
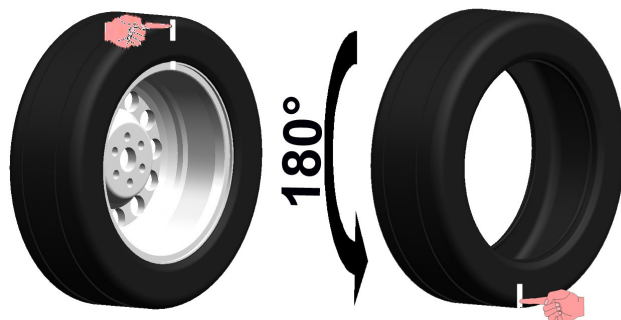
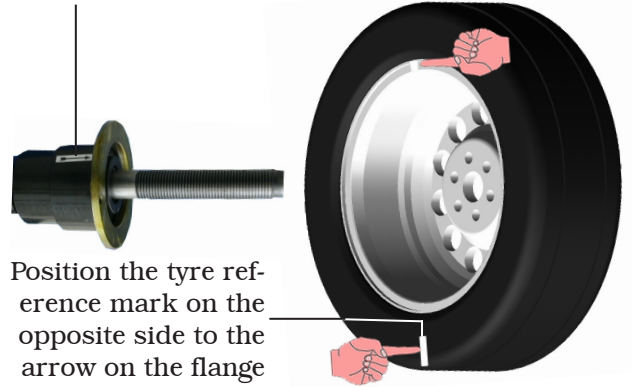


Fig. 76

Fit the wheel back on the wheel balancer, positioning the reference mark on the rim in line with the arrow on the flange.

Position the reference mark on the rim in line with the arrow on the flange



Position the tyre reference mark on the opposite side to the arrow on the flange

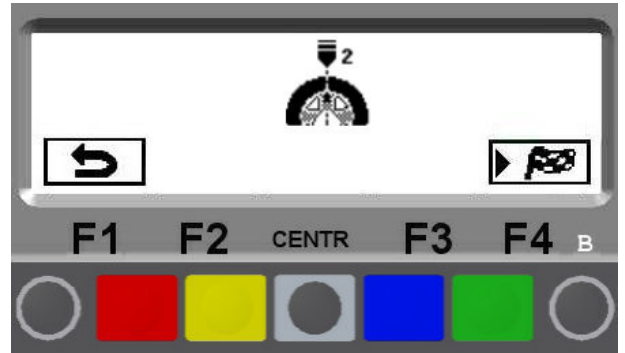


Fig. 77

Close the protection guard (if present) to perform the second spin or press the "F4 key". At the end of the spin the monitor will display the following image:

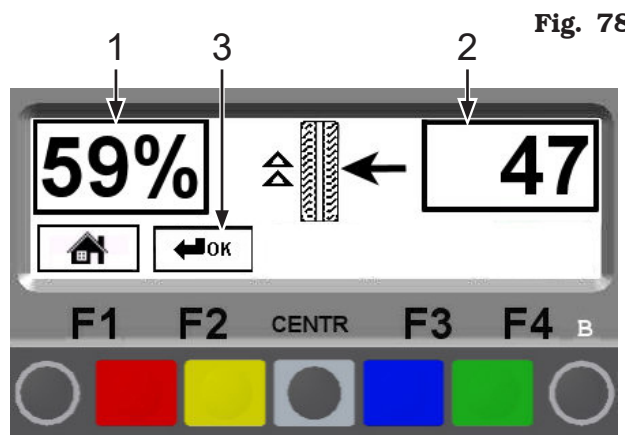


Fig. 78

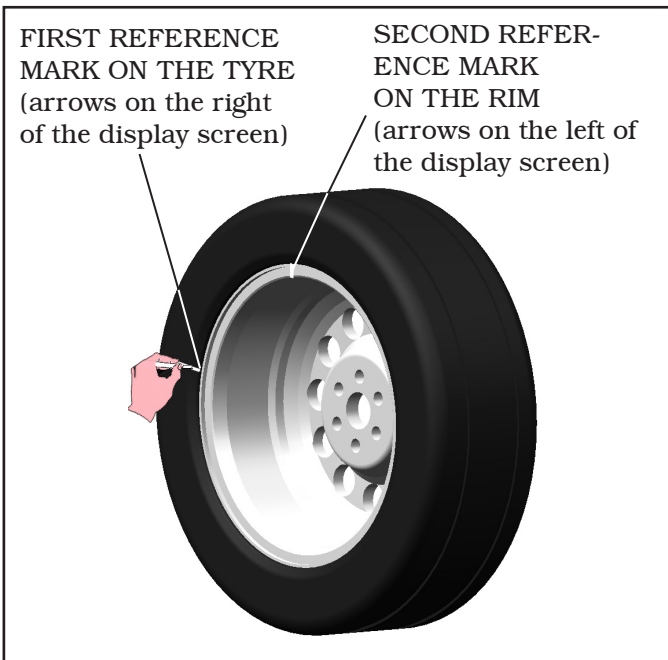
KEY

- 1 - % value of the possible unbalance reduction compared to wheel current situation
- 2 - Current static unbalance value in grams. It can be reduced with a further wheel and rim rotation
- 3 - Display again of the page with previous unbalance values (YELLOW) (F2)

Cancel the previously made reference marks.
Position the wheel following the arrows on the display screen. Look at the arrows on the right. When these are horizontally (see Par. 14.3.2) make the FIRST reference mark on the rim.



Look at the arrows on the left. When these are placed horizontally make the SECOND reference mark on the rim.



Remove the wheel from the wheel balancer. Remove the wheel and turn the tyre on the rim so that the two points coincide. Fit the wheel on the balancer (see Fig. 79) so that the two reference marks next to the

arrow on the mandrel flange and press key

Fig. 79



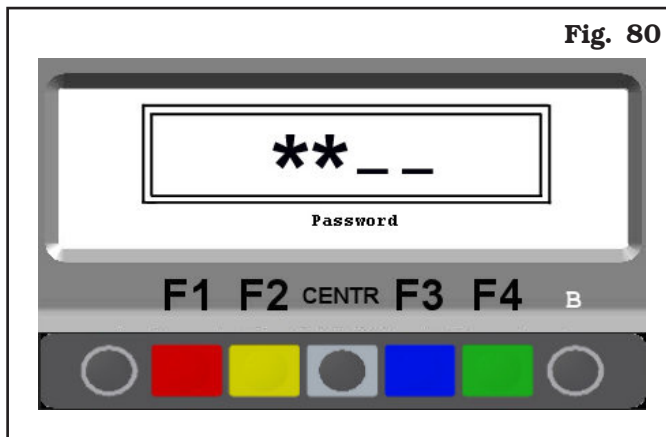
Press the green key corresponding to icon on the keyboard. Perform another spin and correct any residual unbalance using the weights at disposal.

19.0 SETUP OF UNITS OF WEIGHT MEASUREMENT AND RIM WIDTH/DIAMETER AND SETTING CAR/MOTORCYCLE MODE

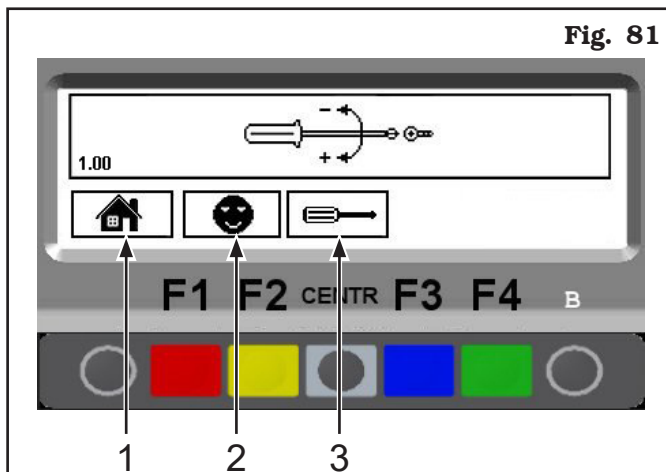
The weight determining wheel unbalance can be indicated on the display in "gram" or "ounce" measurement unit.

The width and diameter can be indicated in "inches" or "mm"

To change the unit of measurement, press the "F1 key" from the opening presentation page (see **Fig. 18**):




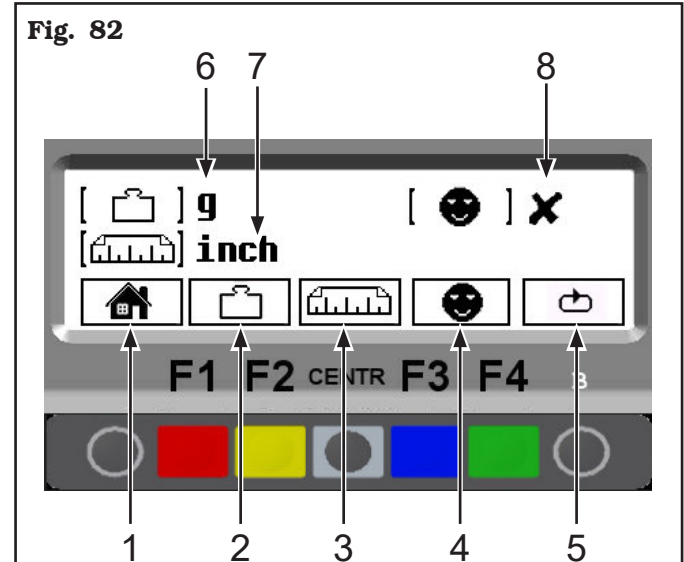
Type in the password **F1-F2-CENTR-F3**, the program will show the screen page in **Fig. 81**:



KEY

- 1 - Return to initial program page (RED) (F1)
- 2 - Configuration (YELLOW) (F2)
- 3 - Calibrations (CENTRAL)

Press key "F2"  and the program will display the following figure:




KEY

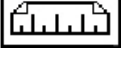
- 1 - Return to **Fig. 81** screen page (RED) (F1)
- 2 - Change unit of weight measurement from grams (g) to ounces (oz) and vice versa (YELLOW) (F2)
- 3 - Change unit of width/diameter measurements from inches (inch) to millimetres (mm) and vice versa (CENTRAL)
- 4 - Enable/disable "User control" function see Par. 14.2 (BLUE) (F3)
- 5 - Display subsequent operations (GREEN) (F4)
- 6 - Selected weight measurement unit = grams (g)
- 7 - Selected unit of width/diameter measurement = inches (inches)
- 8 - "User Control" function

ENGAGED → 


"User Control" function

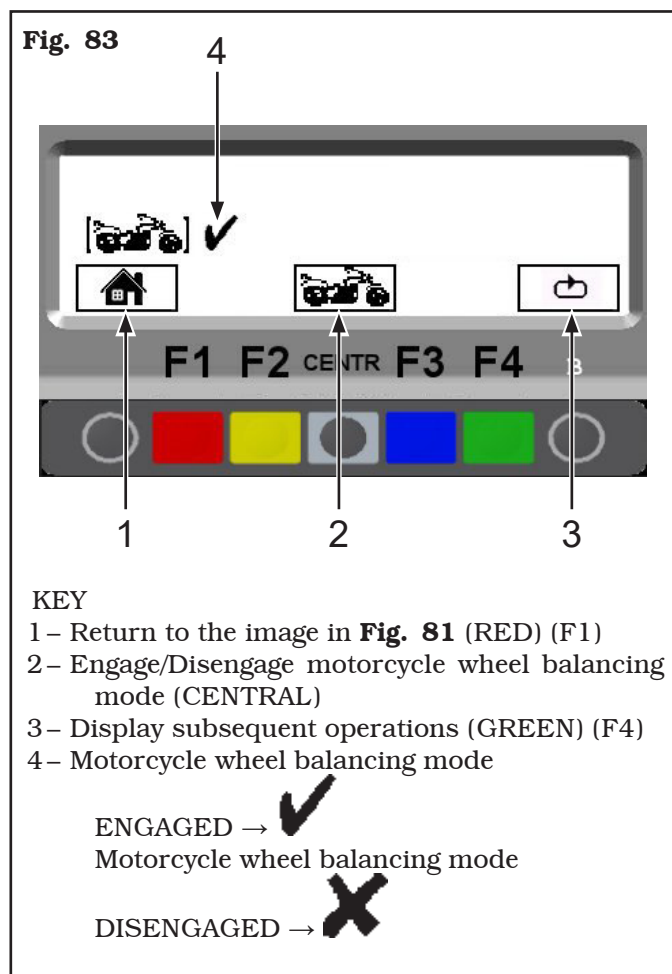
DISABLED → 


Press the "F2 key"  to change weight unit of measurement from grams to ounces and vice versa. The symbol "g" or "oz" appears on the monitor.

Press the "F3 key"  to change the width and diameter unit of measurements from inches to millimetres and vice versa. The symbol "inch" or "mm" appears on the monitor.

After setting the required measurement unit, to engage or disengage the motorcycle wheel balancing mode,


press the "F4 key" . The program will show the following image:




Press the "CENTR key"  to engage or disengage motorcycle wheel balancing mode. All the settings of the measurement unit are stored even after the machine is switched off.

19.1 Width measurement options setting


To enable the "automatic rim width measurement", optional devices, from the opening presentation page

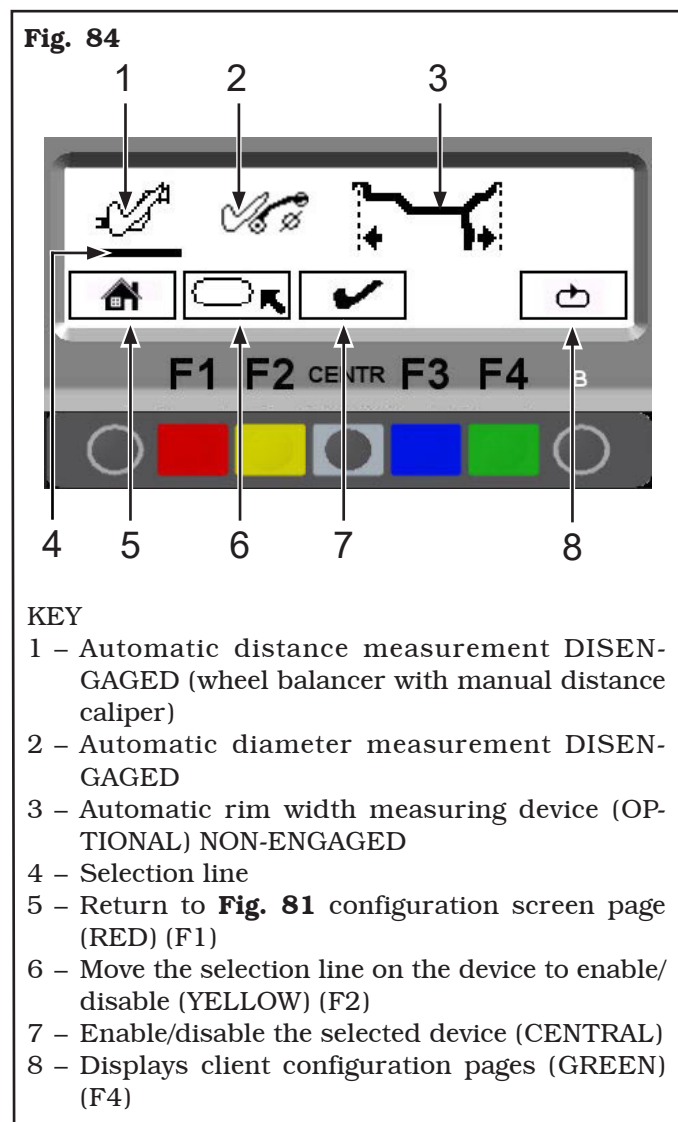
(see **Fig. 18**), press the "F1 key" ; the program will display the page in **Fig. 80**.

Enter password **F1-F2-CENTR-F3** to access the "customer configuration" screen page (see **Fig. 81**).


Press the "F2 key" .

From the "client configuration" page (see **Fig. 82**),

press **4 times in succession** "key F4" . The image will be displayed as in **Fig. 84**.



To enable the required device, move the selection line under the symbol that represents it by means of the "F2

key"  and activate by means of the "CENTR

key" .

When the device is enabled, this is shown by a “mark off”, see example below:

Rim width automatic measuring device EN-GAGED →



Rim width automatic measuring device DIS-ENGAGED →



At the end press key “F1”  to exit.

19.2 Lower weight limit

Correction weight below a certain limit is normally shown equal to zero.

In car way this limit can be set from 10 g to 1 g.

At the end of the spin however, by pressing the key





(see example **Fig. 42**), the weight can be displayed with gram resolution.

To change the resolution and lower limit, from the opening presentation page (see Figure **Fig. 18**), press



the “F1 key”; the program will display the image in **Fig. 80**.

Press the “F2 key” . Enter password **F1-F2-CENTR-F3** to access the “customer configuration”

screen page (**Fig. 81**). Press the  key

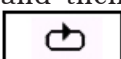
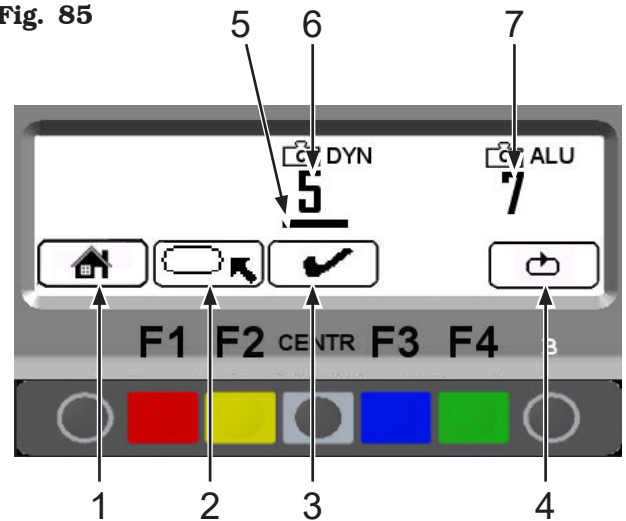
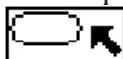


and then press 5 successive times the “F4 key”  , the program will show the following screen page:

Fig. 85



KEY

- 1 – Return to **Fig. 81** screen page (RED) (F1)
- 2 – Move the box onto resolution or lower limit value (YELLOW) (F2)
- 3 – Change the selected values with the box (CENTRAL)
- 4 – Displays client configuration pages (GREEN) (F4)
- 5 – Selection line
- 6 – Lower weight limit setting (5 g) for dynamic wheel balancing mode
- 7 – Lower weight limit setting (7 g) for ALU (all types) PAX and STATIC modes (all types)

Move the box onto the option to be changed by means of the “F2 key” , and set the lower limit by means of the “centr key” . After terminating the operation, press the “F1 key”  to exit.



IN THE PLANT, THE LOWER LIMIT FOR THE DYNAMIC WHEEL BALANCING MODE IS SET TO 5 G. THE LOWER LIMIT FOR ALL THE OTHER MODES IS SET TO 7 G.

19.3 Setting adhesive weight dimensions

To ensure the balancing machine precisely calculates the dimensions and total adhesive weights, set the thickness and length of the adhesive weights at disposal.

To set the above values, from the opening presentation page (see **Fig. 18**), press the "F1 key" ; the program will display the image in **Fig. 80**.

Enter password **F1-F2-CENTR-F3** to access the "customer configuration" screen page (**Fig. 81**).

Press the "F2 key" and then press 6 successive times the "F4 key" , the program will show the following screen page:

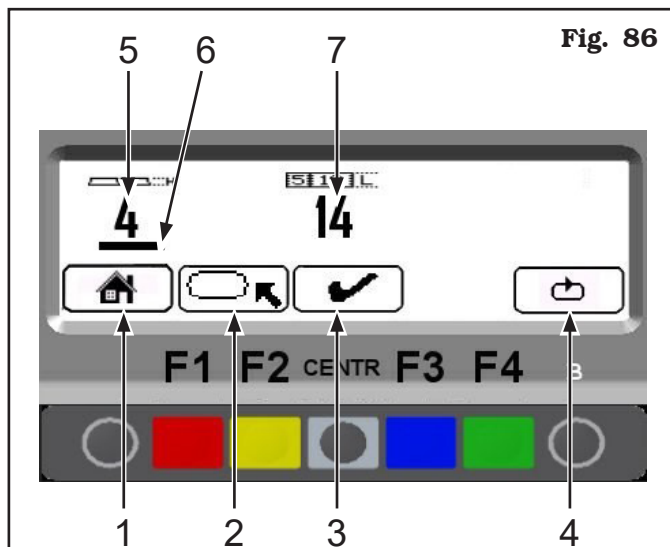


Fig. 86

KEY

- 1 - Return to **Fig. 81** screen page (RED) (F1)
- 2 - Move the box onto adhesive weight dimension or static threshold percentage (YELLOW) (F2)
- 3 - Change the selected values with the box (CENTRAL)
- 4 - Displays client configuration pages (GREEN) (F4)
- 5 - Setting the adhesive weight thickness (4mm)
- 6 - Selection line
- 7 - Setting the adhesive weight length (14 mm)

Move the box on the option to be changed using "key

F2" . Set the adhesive weight dimensions and the static threshold percentage by means of the

"CENTR key" .

After terminating the operation, press the "F1 key"

to exit.

20.0 WHEEL BALANCER CALIBRATION

From program presentation screen page, when the machine is set to CAR or MOTORCYCLE mode (the

symbol "" or "" appears on the screen, see **Fig. 18**) press "F1 key" and enter the password **F1-F2-CENTR-F3**.

The program will display the following image:

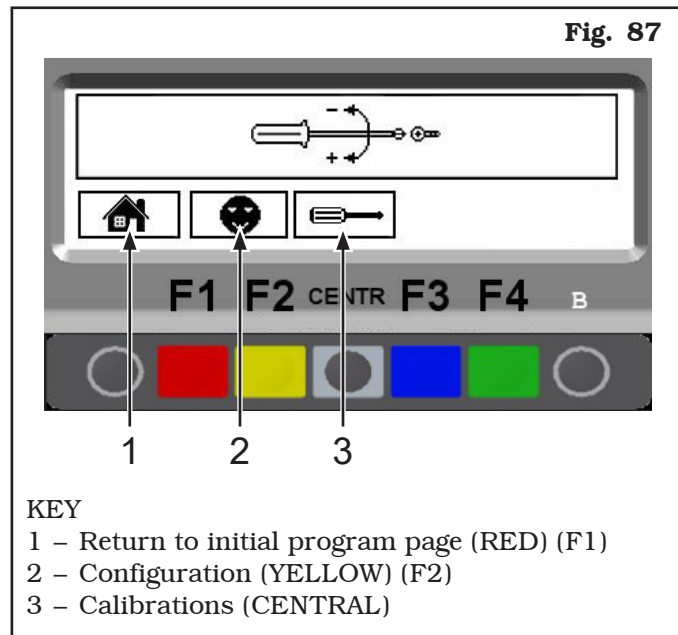
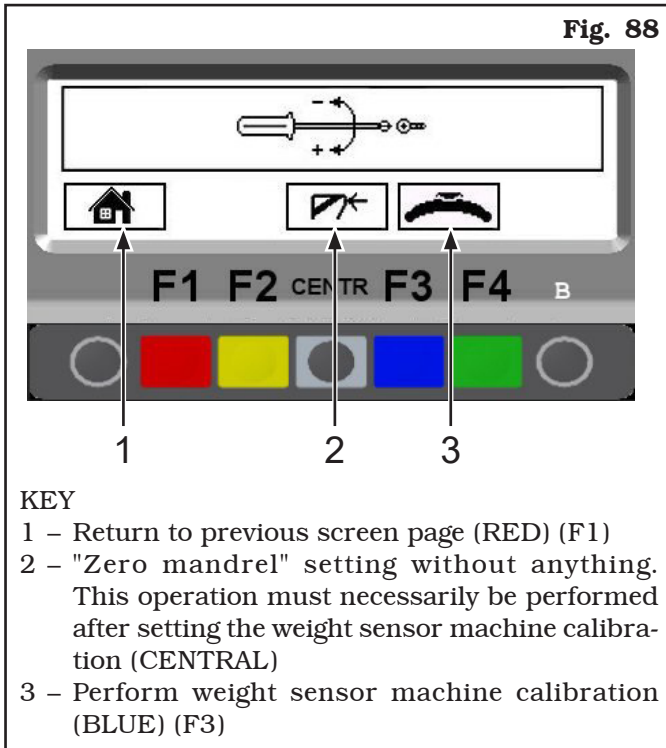


Fig. 87

KEY

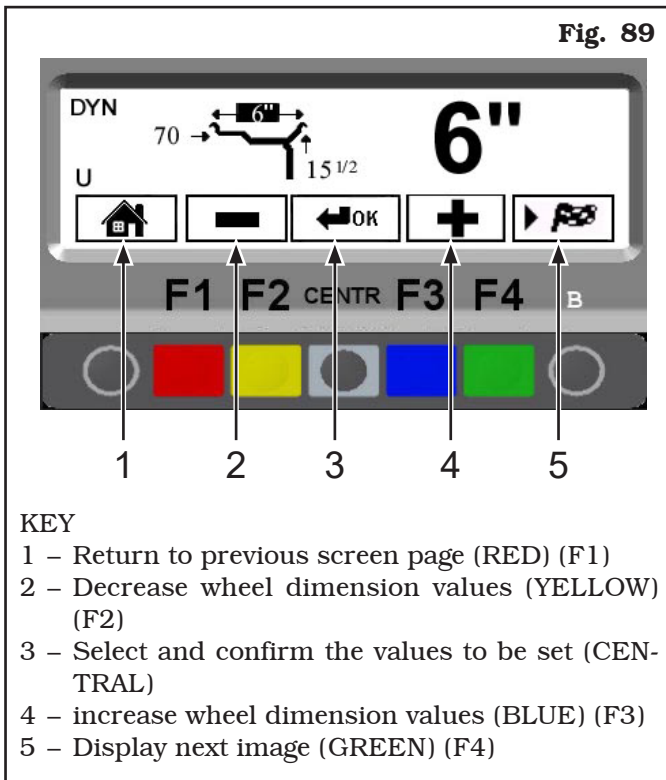
- 1 - Return to initial program page (RED) (F1)
- 2 - Configuration (YELLOW) (F2)
- 3 - Calibrations (CENTRAL)

Press key "CENTR" and the program will display the following figure:




Fit a wheel of medium size, possibly balanced ($\varnothing = 13 \div 14"$, $L = 4 \div 5"$).

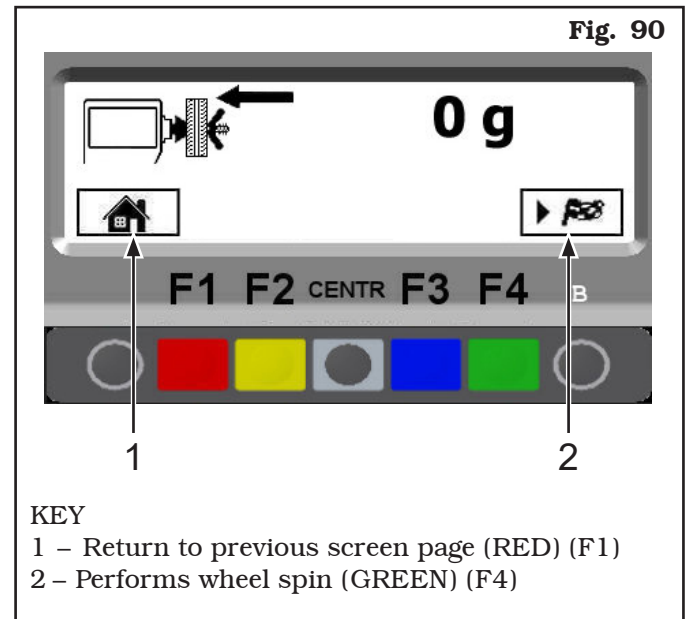
From the calibration page menu (see **Fig. 88**) press the weight sensor calibration "F3 key"; the program will display the following image:



Carefully enter distance, diameter and wheel width measurements, pressing the "CENTRE key" to select each measurement and confirm.

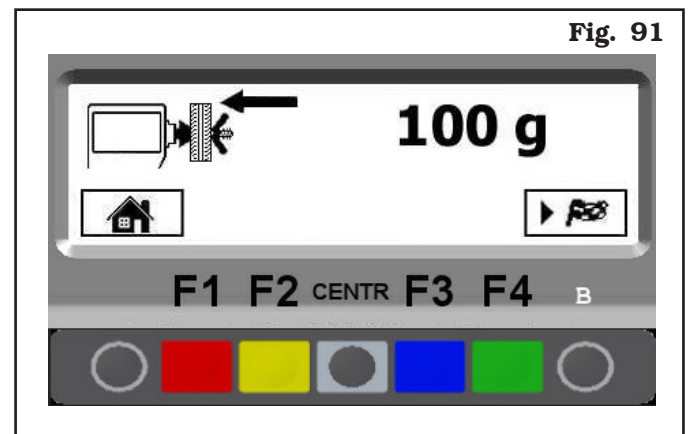
Select the "MINUS"  or "PLUS"  key to enter the desired values.

Press the "F4 key" to continue. The program will display the following image:



As shown in **Fig. 90**, press the "F4 key" to perform a wheel spin without adding weights.

After making the spin, the program will show **Fig. 91**:



Fit 100 g on the outside of the wheel, positioning the weight at 12 o' clock.

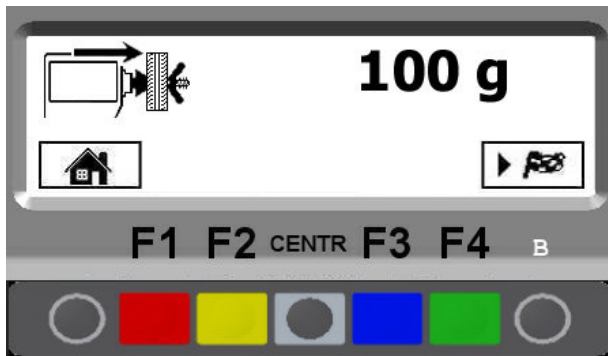
Press "F4 key" to perform the spin.

After the spin, remove the 100 g weight from the outside and fit it inside the wheel, as shown in **Fig. 92**.



FIT 100 G ON THE INSIDE OF THE WHEEL IN THE SAME POSITION OF THE WEIGHT OUTSIDE, POSITIONING IT HIGH UP ON THE VERTICAL.

Fig. 92



After the spin, remove the 100 g weight from the inside of the wheel and confirm by means of the "CENTRE key".

Fig. 93



The calibration operation is now over. The program will show **Fig. 87**. Press the "CENTRE key" to return to the first calibrations page.

20.1 "Zero mandrel" setting without anything


Always perform this operation, after the calibration with the tool or with the wheel.

From the setting menu page (see **Fig. 88**) press the "CENTRE" key relating to the "zero mandrel" setting. Press key "F4" to perform the mandrel reset spin without having fitted anything. Once the spin is over, the

screen page with  will be displayed.

Mandrel resetting is complete. Press key "F1" to exit.

21.0 ERROR SIGNALS

During wheel balancer operation, if wrong commands are given by the operator or device faults occur, an error code or symbol may appear on the display screen. Press key F1  to return to the previous program phase after remedying the fault. Below is a troubleshooting chart.

Error code	Error description	Cause
2	No rotation signal	<ul style="list-style-type: none"> - Faulty position transducer or transducer not fitted correctly. - The motor is faulty or has not started because something is preventing its rotation.
3	Excessive weight value in wheel balancer calibration	During the calibration procedure, the machine detects excessive weight. <ul style="list-style-type: none"> - The weight may not have been fitted properly. - The data acquisition or measurement sensor may be faulty.
8	Insufficient weight value in wheel balancer calibration	During the calibration procedure, the machine detects insufficient weight. <ul style="list-style-type: none"> - The weight may not have been fitted properly. - The data acquisition or measurement sensor may be faulty.
9	Calibration spin not completed	During the calibration procedure, the spin is not completed because the key has been pressed (STOP).



22.0 ROUTINE MAINTENANCE



BEFORE CARRYING OUT ANY ROUTINE MAINTENANCE OR ADJUSTMENT PROCEDURE, POSITION THE MAIN SWITCH "0", DISCONNECT THE MACHINE FROM THE ELECTRICITY SUPPLY USING THE SOCKET/PLUG COMBINATION AND CHECK THAT ALL MOBILE PARTS ARE AT A STANDSTILL.



BEFORE EXECUTING ANY MAINTENANCE OPERATION, MAKE SURE THERE ARE NO WHEELS LOCKED ONTO THE MANDREL.

To guarantee the efficiency and correct functioning of the machine, it is essential to carry out daily or weekly cleaning and weekly routine maintenance, as described below.

Cleaning and routine maintenance must be conducted by authorized personnel and according to the instructions given below.

- Remove deposits of tyre powder and other waste materials with a vacuum cleaner.

DO NOT BLOW IT WITH COMPRESSED AIR.

- Do not use solvents to clean the pressure regulator.



ANY DAMAGE TO THE MACHINE DEVICES RESULTING FROM THE USE OF LUBRICANTS OTHER THAN THOSE RECOMMENDED IN THIS MANUAL WILL RELEASE THE MANUFACTURER FROM ANY LIABILITY!!

**23.0 TECHNICAL DATA****23.1 Technical electrical data**

		G2.120R	G2.121R	G2.121RFM
Max. absorbed voltage (W)		100		
Power supply	Voltage (V)	110 - 230		
	Phases	1		
	Frequency (Hz)	50 / 60		

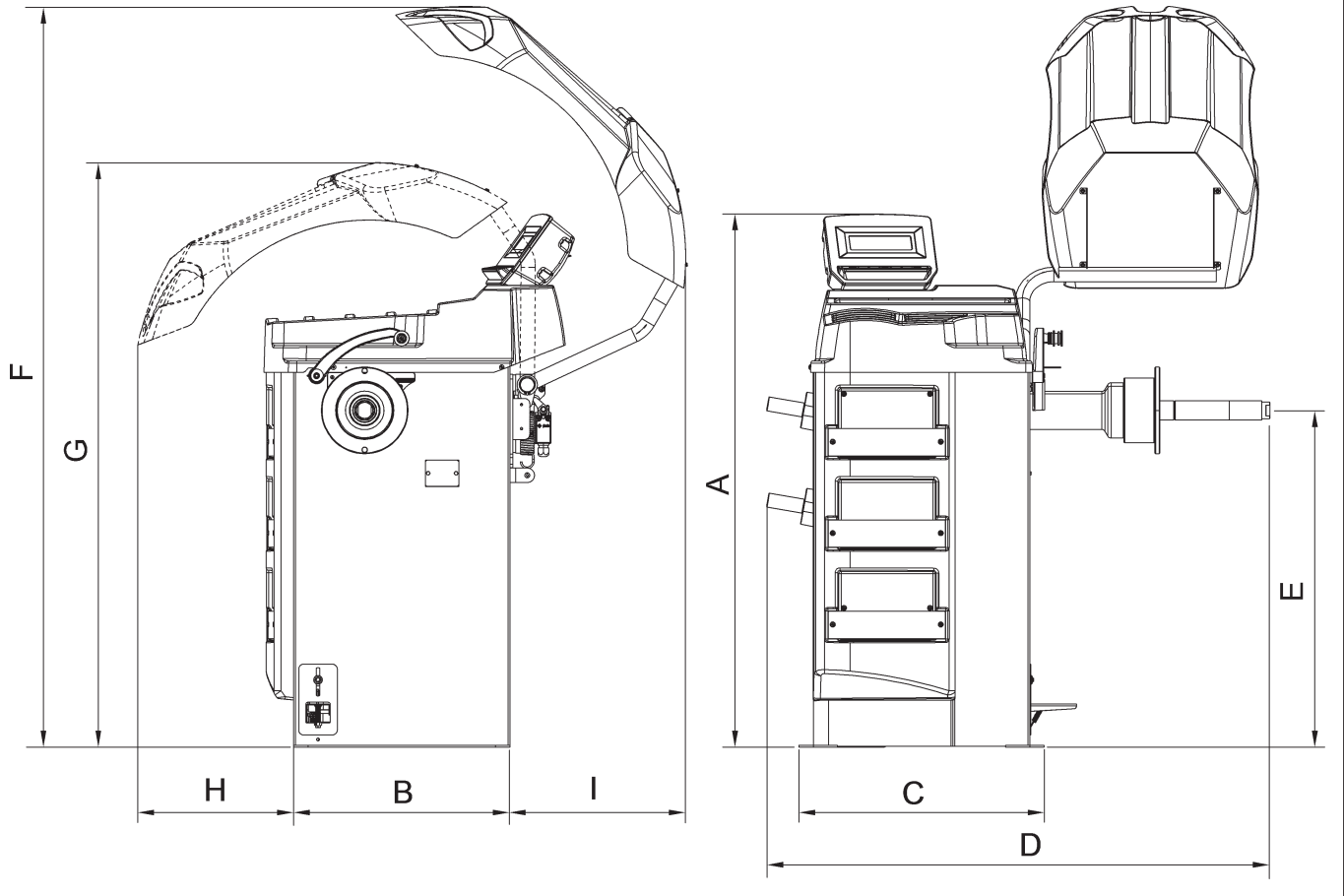
23.2 Technical mechanical data

		G2.120R	G2.121R	G2.121RFM
Wheel max. weight (kg)		65		
Balancing speed (revolutions/min)		< 100		
Balancing precision (g)		1		
Rim width setting (inches)		1.5 ÷ 22		
Rim diameter setting (inches)		10 ÷ 26 automatic (10 ÷ 30)		
Max wheel diameter inside protection (mm)		-	900	
Max wheel width inside protection (mm)		-	560	
Sound emission level (dBA)		< 70		
Cycle time (sec)		6		

		G2.120R	G2.121R	G2.121RFM
Weight (Kg)		100	105	110

23.3 Dimensions

Fig. 94



	G2.120R	G2.121R	G2.121RFM
A (mm)		1108	
B (mm)		450	
C (mm)		510	
D (mm)		1047	
E (mm)		700	
F (mm)	-		1540
G (mm)	-		1220
H (mm)	-		329
I (mm)	-		366

24.0 STORING

If storing for long periods disconnect the main power supply and take measures to protect the machine from dust build-up. Lubricate parts that could be damaged from drying out.

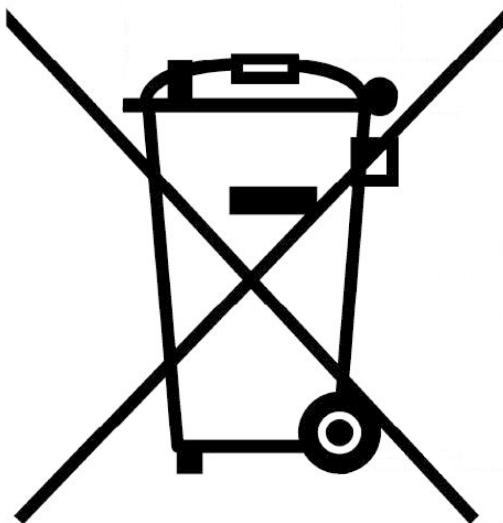
25.0 SCRAPPING

When the decision is taken not to make further use of the machine, it is advisable to make it inoperative by removing the connection pressure hoses. The machine is to be considered as special waste and should be dismantled into homogeneous parts. Dispose of it in accordance with current legislation.

Instructions for the correct management of waste from electric and electronic equipment (WEEE) according to the Italian legislative decree 49/14 and subsequent amendments.

In order to inform the users on the correct way to dispose the product (as required by the article 26, paragraph 1 of the Italian legislative decree 49/14 and subsequent amendments), we communicate what follows: the meaning of the crossed dustbin symbol reported on the equipment indicates that the product must not be thrown among the undifferentiated rubbish (that is to say together with the "mixed urban waste"), but it has to be managed separately, to let the WEEE go through special operations for their reuse or treatment, in order to remove and dispose safely the waste that could be dangerous for the environment and to extract and recycle the raw materials to be reused.

Fig. 95



26.0 REGISTRATION PLATE DATA

		Ravaglioli s.p.a. 40037 - PONTECCHIO MARCONI/ITALIA TEL. 051-6781511 - TELEX 510697 RAV I P.O.B. 1690 - 40100 BOLOGNA/ITALIA FAX + 39 (051) 846349	
MODEL			
SERIAL N°	YEAR		

The validity of the Conformity Declaration enclosed to this manual is also extended to products and/or devices the machine model object of the Conformity Declaration can be equipped with.



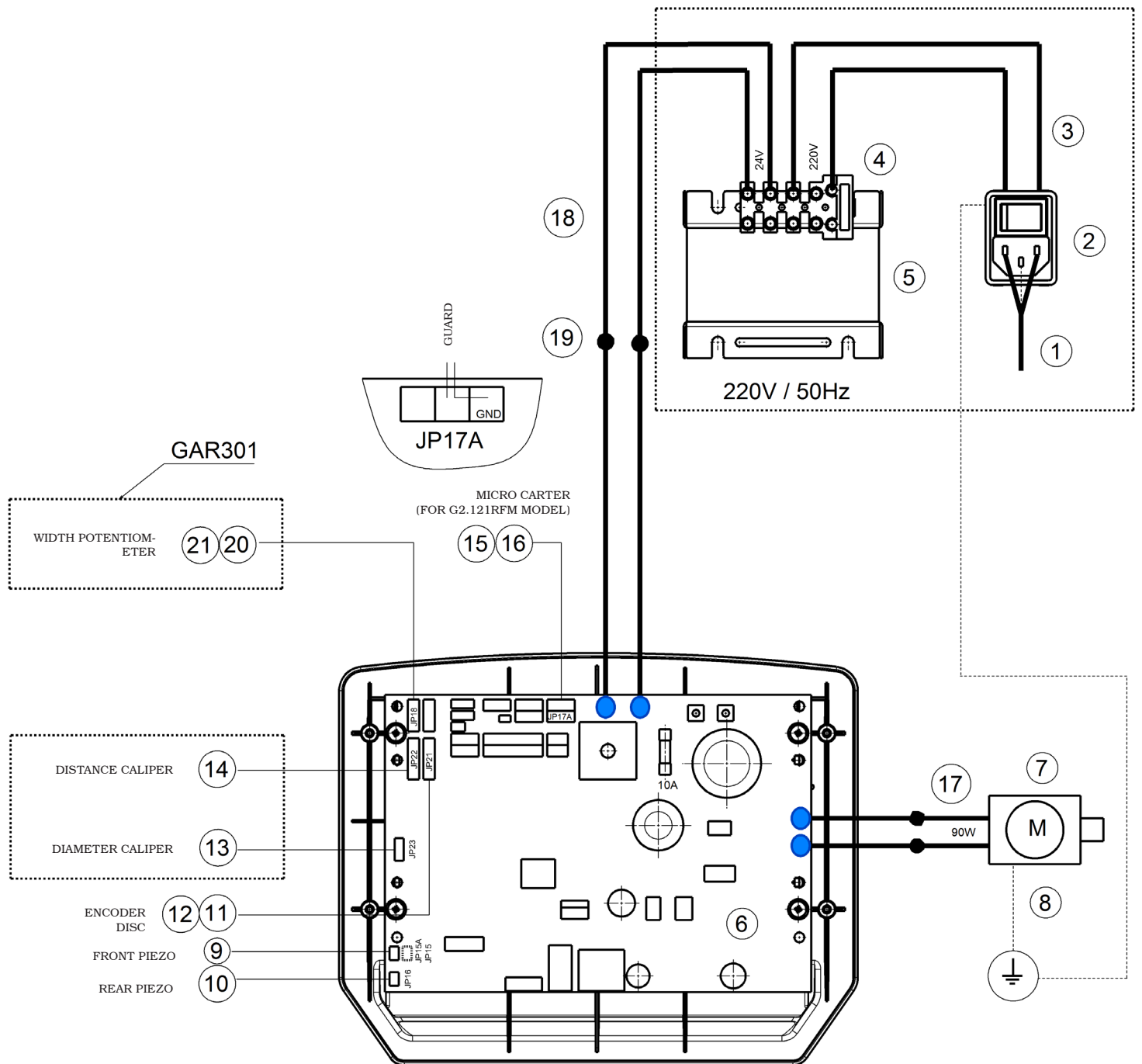
ATTENTION: TAMPERING WITH, CARVING, CHANGING ANYHOW OR EVEN REMOVING MACHINE IDENTIFICATION PLATE IS ABSOLUTELY FORBIDDEN; DO NOT COVER IT WITH TEMPORARY PANELS, ETC., SINCE IT MUST ALWAYS BE VISIBLE.

Said plate must always be kept clean from grease residues or filth generally.

WARNING: Should the plate be accidentally damaged (removed from the machine, damaged or even partially illegible) inform immediately the manufacturer.

27.0 FUNCTIONAL DIAGRAMS

Here follows a list of the machine functional diagrams.



KEY

- | | |
|-------------------------------------------------|-------------------------------------------------------------|
| 1 - Power supply cable | 13 - Potentiometer with cable |
| 2 - Power supply switch with plug | 14 - Board |
| 3 - Connection cable from switch to transformer | 15 - Cable for wheel protection micro (for G2.121RFM model) |
| 4 - Fuse | 16 - Limit switch (for G2.121RFM model) |
| 5 - Transformer | 17 - Motor cable extension |
| 6 - Display kit | 18 - Transformer cable extension |
| 7 - Motor | 19 - Clamp for electric connector |
| 8 - Ground cable | 20 - Width potentiometer extension cable (for GAR301) |
| 9 - Front piezo | 21 - Potentiometer with shielded cable (for GAR301) |
| 10 - Rear piezo | |
| 11 - Wheel position sensor cable | |
| 12 - Buffered encoder card | |

G2.120R - G2.121R - G2.121RFM

**WIRING CONNECTION
DIAGRAM**

1296-M018-0_R



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GB



1296-R018-0_R

**G2.120R
G2.121R
G2.121RFM**

- I** 28.0 LISTA DEI COMPONENTI
- GB** 28.0 LIST OF COMPONENTS
- D** 28.0 TEILELISTE
- F** 28.0 LISTE DES PIÈCES DETACHÉES
- E** 28.0 LISTA DE PIEZAS



GLI ESPLOSI SERVONO SOLO PER L'IDENTIFICAZIONE DELLE PARTI DA SOSTITUIRE. LA SOSTITUZIONE DEVE ESSERE EFFETTUATA DA PERSONALE PROFESSIONALMENTE QUALIFICATO.



THE DIAGRAMS SERVE ONLY FOR THE IDENTIFICATION OF PARTS TO BE REPLACED. THE REPLACEMENT MUST BE CARRIED OUT PROFESSIONALLY QUALIFIED PERSONNEL.



DIE ZEICHNUNGEN DIENEN NUR ZUR IDENTIFIZIERUNG DER ERSATZTEILE. DIE ERSETZUNG MUSS DURCH QUALIFIZIERTES PERSONAL ERFOLGEN.



LES DESSINS NE SERVENT QU'À L'IDENTIFICATION DES PIÈCES À REMPLACER. LE REMPLACEMENT DOIT ÊTRE EFFECTUÉ PAR UN PERSONNE PROFESSIONNELLEMENT QUALIFIÉ.



LOS DIBUJOS EN DESPIECE SIRVEN ÚNICAMENTE PARA IDENTIFICAR LAS PIEZAS QUE DEBEN SUSTITUIRSE. LA SUSTITUCIÓN DE PIEZAS DEBE EFECTUARLA EXCLUSIVAMENTE PERSONAL PROFESIONALMENTE CUALIFICADO.

- Per eventuali chiarimenti interpellare il più vicino rivenditore oppure rivolgersi direttamente a:
- For any further information please contact your local dealer or call:
- Im Zweifelsfall oder bei Rückfragen wenden Sie sich bitte an den nächsten Wiederverkäufer oder direkt an:
- Pour tout renseignement complémentaire s'adresser au revendeur le Plus proche ou directement à:
- En caso de dudas, para eventuales aclaraciones, póngase en contacto con el distribuidor más próximo ó diríjase directamente a:

Technical services: **RAVAGLIOLI S.p.A.** - Via 1° Maggio, 3 - 40037 Pontecchio Marconi - Bologna Italy
Phone (+39) 051 6781511 - Telex 510697 RAV I - Fax (+39) 051 846349 - e-mail: aftersales@ravaglioli.com

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RAVAGLIOLI S.p.A.

**LISTA DEI COMPONENTI
LIST OF COMPONENTS
TEILELISTE
LISTE DES PIÈCES DÉTACHÉES
LISTA DE PIEZAS**

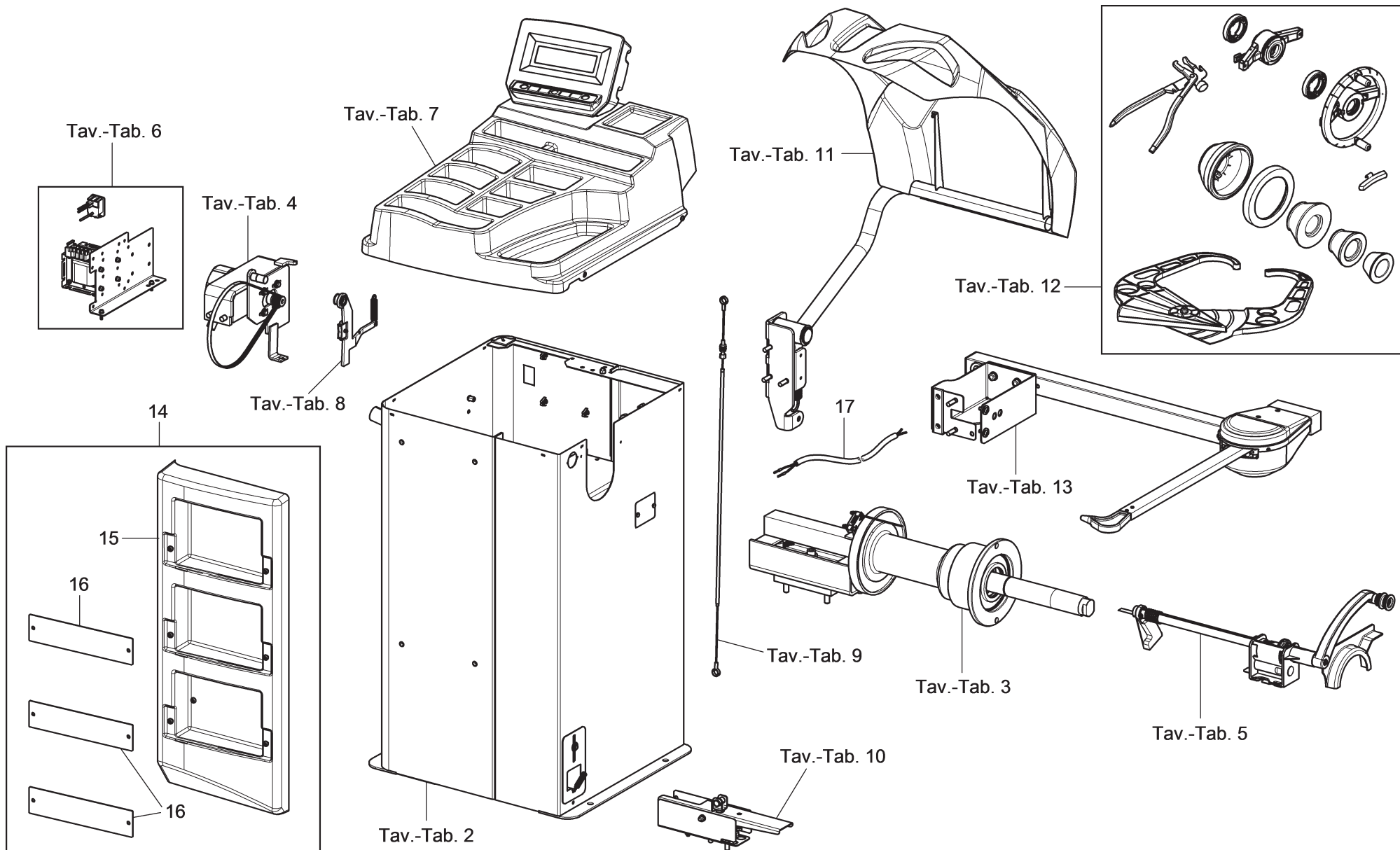
1296-R018-0_R

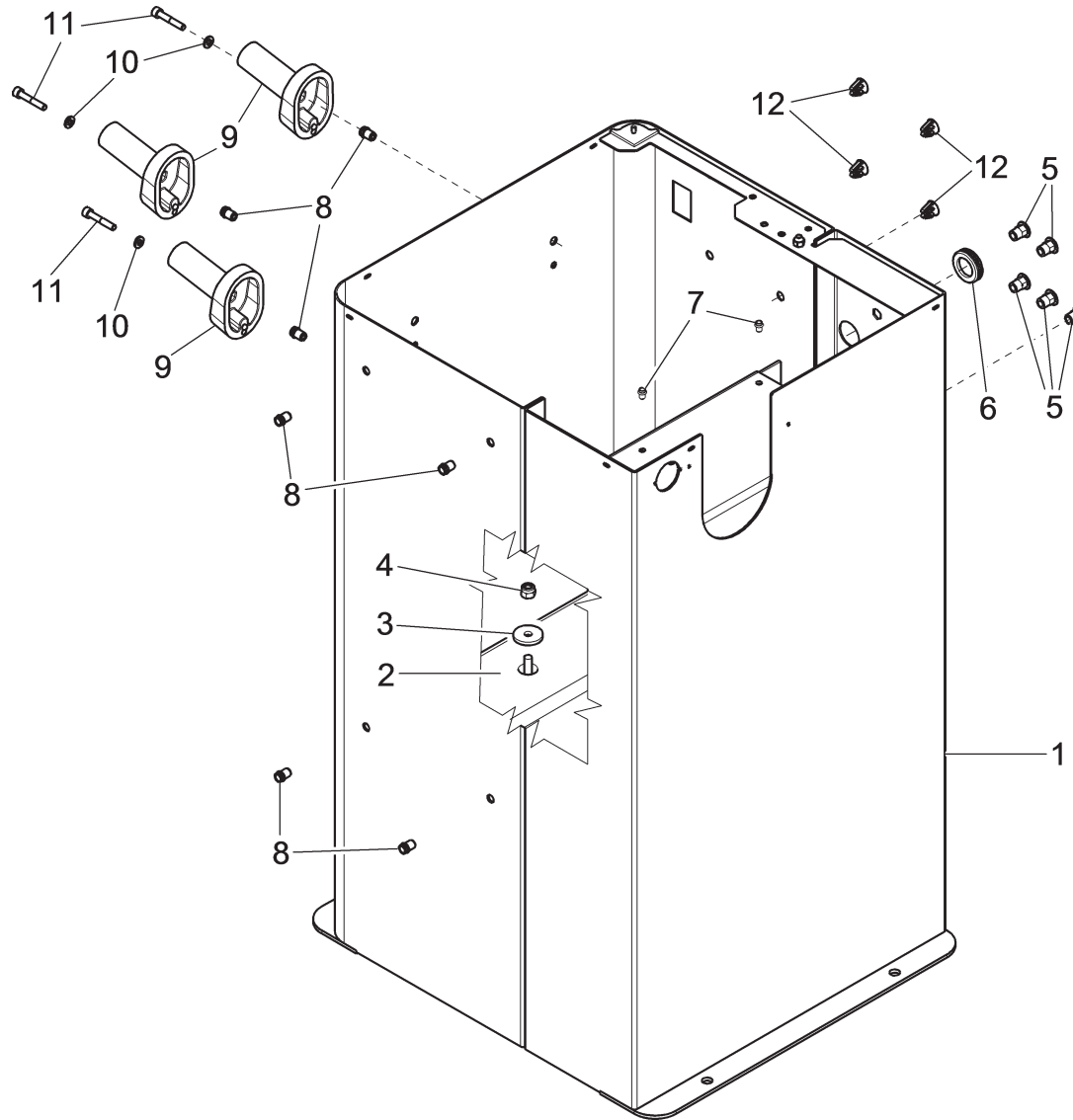
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G2.120R - G2.121R - G2.121RFM

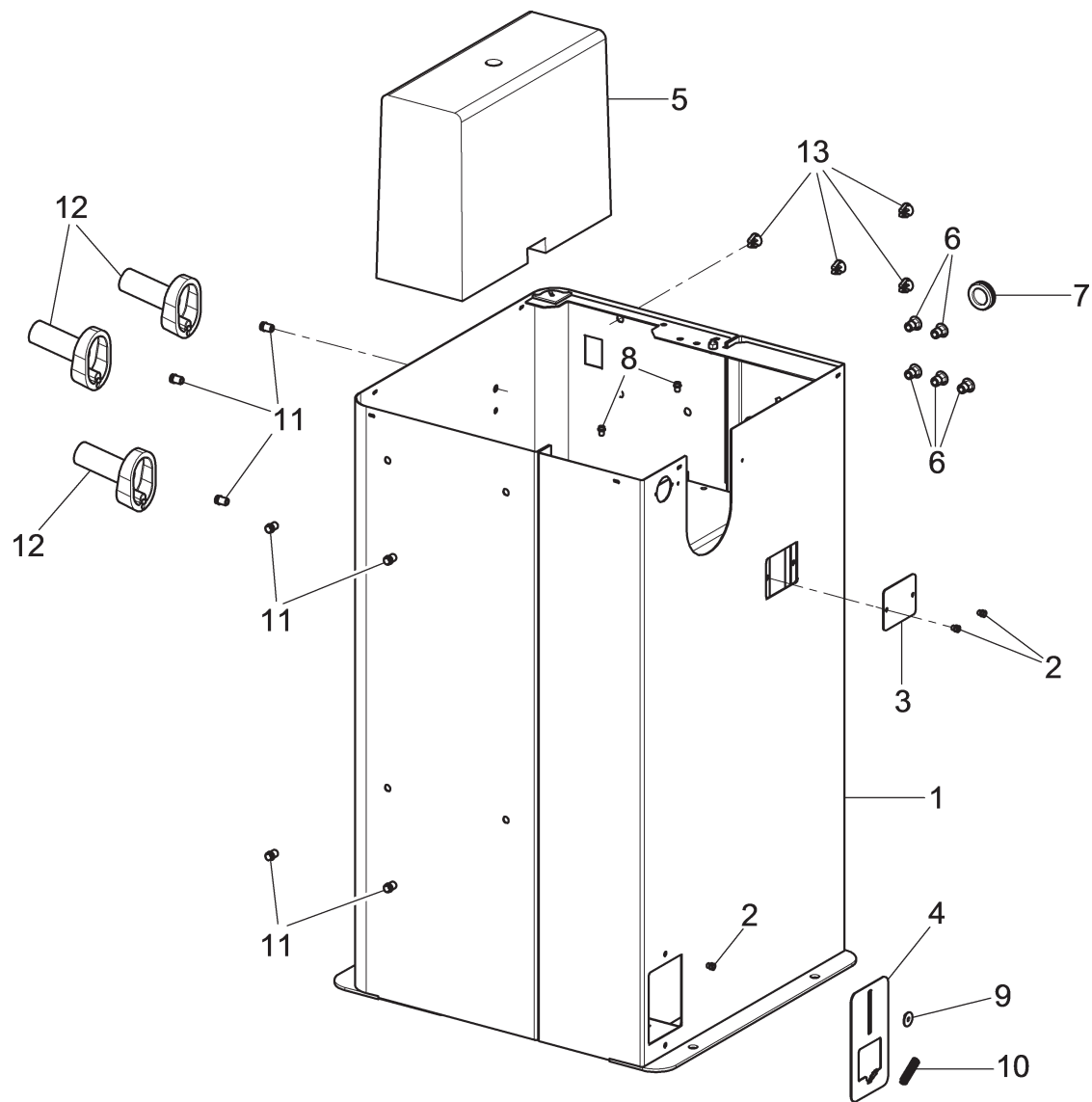
**SOMMARIO - SUMMARY - INHALT
SOMMAIRE - SUMARIO**

<p>Tavola N°1 - Rev. 0 _____ 3</p> <p>ASSIEME GENERALE MAIN ASSEMBLY GENERALSATZ ASSEMBLAGE GENERAL JUNTO GENERAL</p>	<p>Tavola N°8 - Rev. 0 _____ 129695921 13</p> <p>GRUPPO FRENO BRAKE UNIT BREMSATZ GROUPE FREIN GRUPO FRENO</p>
<p>Tavola N°2A - Rev. 0 _____ 129698690 5</p> <p>GRUPPO TELAIO FRAME UNIT RAHMENSATZ GROUPE CHASSIS GRUPO ESTRUCTURA</p>	<p>Tavola N°9 - Rev. 0 _____ 129690152 14</p> <p>GRUPPO AZIONAMENTO FRENO BRAKE OPERATION GROUP SATZ FÜR BREMSBETÄTIGUNG GROUPE ACTIONNEMENT FREIN GRUPO ACCIONAMIENTO FRENO</p>
<p>Tavola N°2B - Rev. 0 _____ 129698700 6</p> <p>GRUPPO TELAIO FRAME UNIT RAHMENSATZ GROUPE CHASSIS GRUPO ESTRUCTURA</p>	<p>Tavola N°10 - Rev. 0 _____ 129690611 15</p> <p>GRUPPO PEDALE FRENO BRAKE PEDAL UNIT BREMSE PEDALSATZ GROUPE PÉDAL FREIN GRUPO PEDAL FRENO</p>
<p>Tavola N°3 - Rev. 0 _____ 129690041 7</p> <p>GRUPPO ROTANTE COMPLETO COMPLETE ROTARY UNIT KOMPLETTER ROTIERENDER SATZ GROUPE ROTATIF COMPLET GRUPO GIRATORIO COMPLETO</p>	<p>Tavola N°11A - Rev. 0 _____ 129698650 16</p> <p>GRUPPO PROTEZIONE RUOTA WHEEL PROTECTION UNIT SATZ FÜR RADSCHUTZ GROUPE PROTECTION ROUE GRUPO PROTECCIÓN RUEDA</p>
<p>Tavola N°4A - Rev. 0 _____ 129690061 8</p> <p>GRUPPO MOTORE MOTOR UNIT MOTORSATZ GROUPE MOTEUR GRUPO MOTOR</p>	<p>Tavola N°11B - Rev. 0 _____ 129698590 17</p> <p>GRUPPO PROTEZIONE RUOTA WHEEL PROTECTION UNIT SATZ FÜR RADSCHUTZ GROUPE PROTECTION ROUE GRUPO PROTECCIÓN RUEDA</p>
<p>Tavola N°4B - Rev. 0 _____ 129690073 9</p> <p>GRUPPO MOTORE MOTOR UNIT MOTORSATZ GROUPE MOTEUR GRUPO MOTOR</p>	<p>Tavola N°12A - Rev. 0 _____ 18</p> <p>GRUPPO DOTAZIONE EQUIPMENT UNIT AUSRÜSTUNGSATZ GROUPE DOTATION GRUPO DOTACIÓN</p>
<p>Tavola N°5 - Rev. 0 _____ 129695270 10</p> <p>GRUPPO CALIBRO TESTER UNIT KALIBERSATZ GROUPE CALIBRE GRUPO CALIBRE</p>	<p>Tavola N°12B - Rev. 0 _____ 19</p> <p>GRUPPO DOTAZIONE EQUIPMENT UNIT AUSRÜSTUNGSATZ GROUPE DOTATION GRUPO DOTACIÓN</p>
<p>Tavola N°6 - Rev. 0 _____ 129690341 11</p> <p>GRUPPO IMPIANTO ELETTRICO ELECTRICAL SYSTEM UNIT SATZ VON ELEKTROANLAGE GROUPE INSTALLATION ÉLECTRIQUE GRUPO INSTALACIÓN ELÉCTRICA</p>	<p>Tavola N°13 - Rev. 0 _____ GAR301 20</p> <p>CALIBRO LARGHEZZA (OPTIONAL) WIDTH GAUGE (OPTIONAL) KALIBER FÜR BREITE (OPTZION) CALIBRE LARGEUR (OPTION) CALIBRE ANCHO (OPCIÓN)</p>
<p>Tavola N°7 - Rev. 0 _____ 129698660 12</p> <p>GRUPPO PLANCA BOARD UNIT BRETTSATZ GROUPE PLANCHE GRUPO TABLERO</p>	

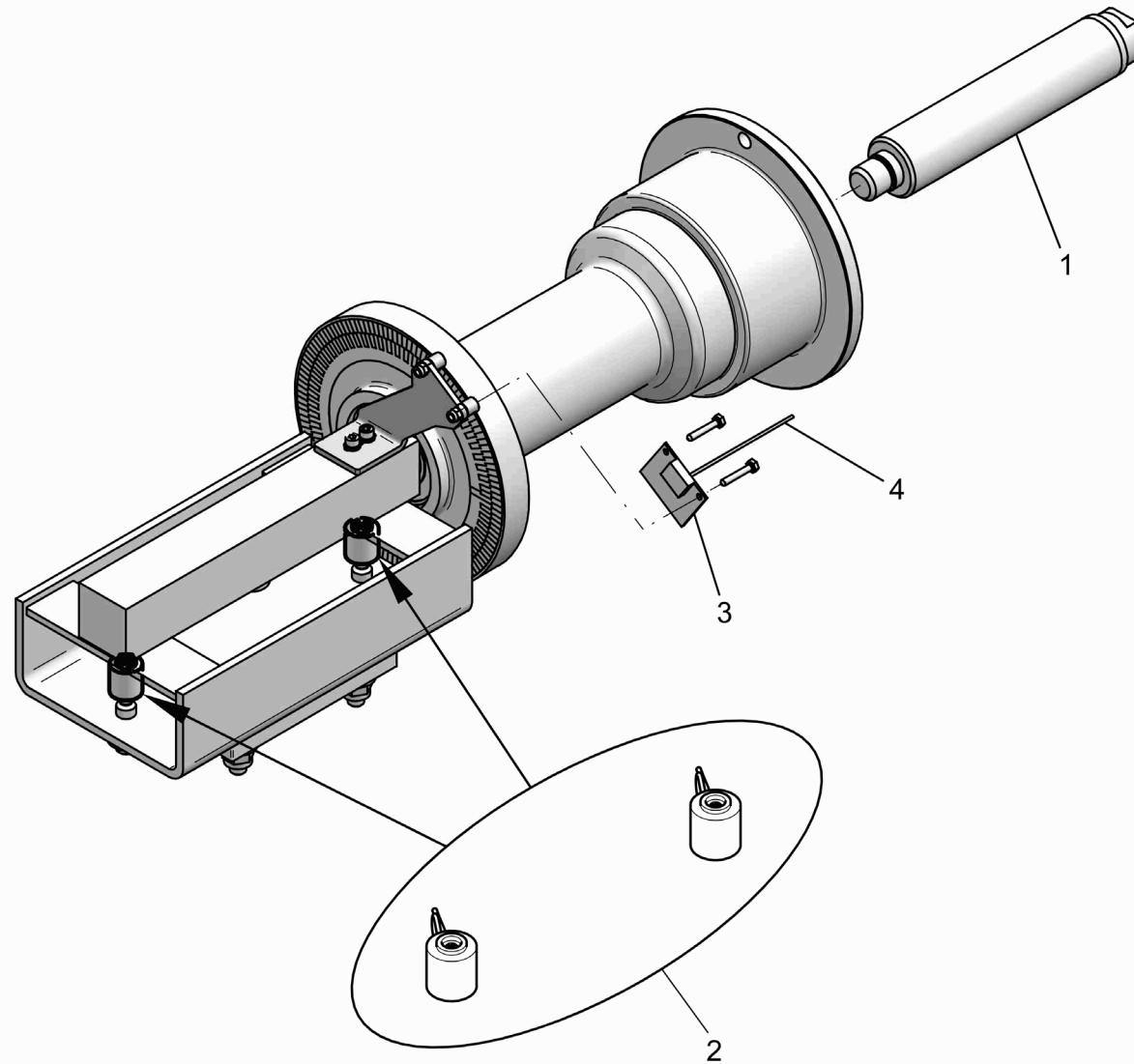




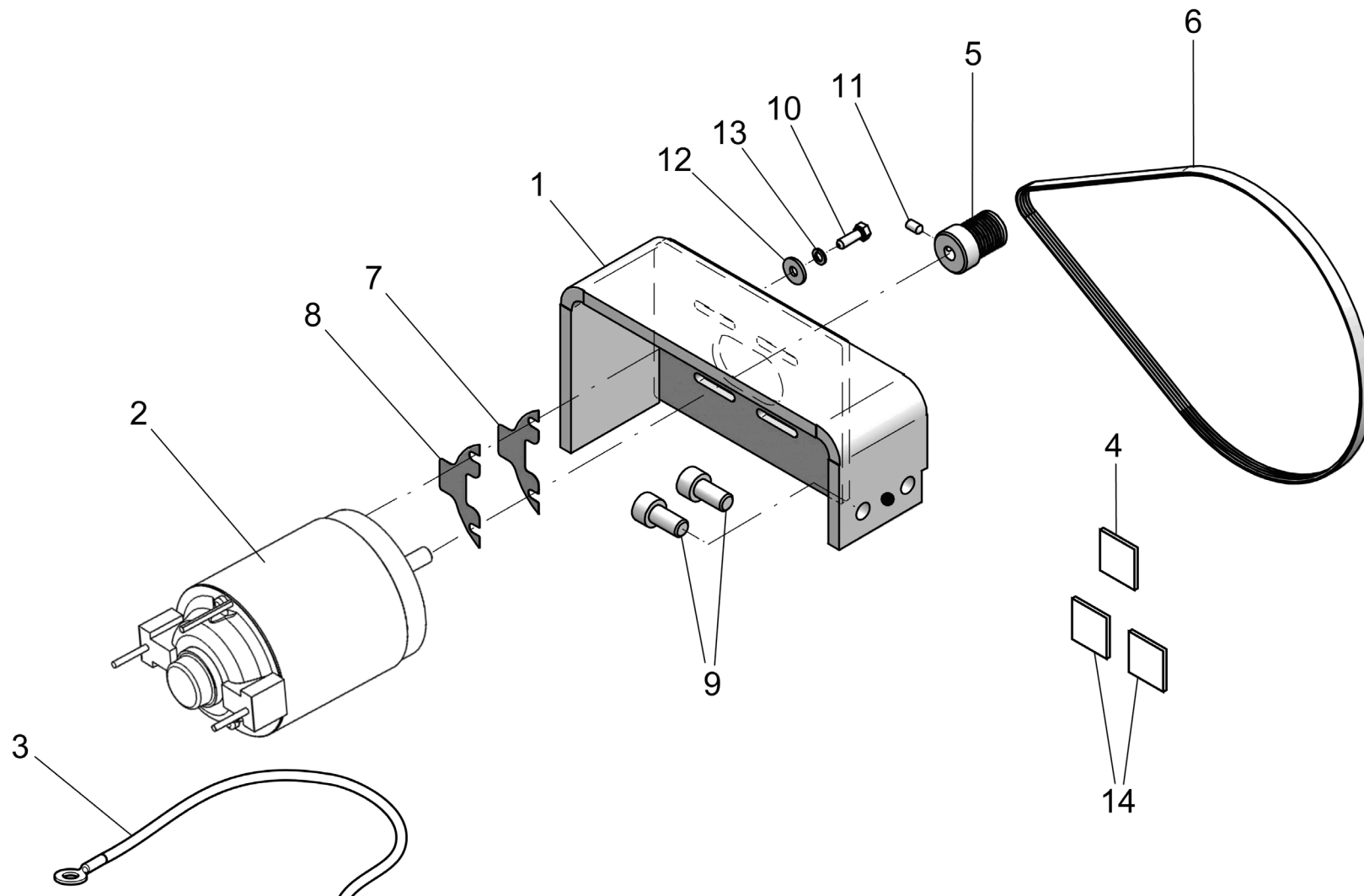
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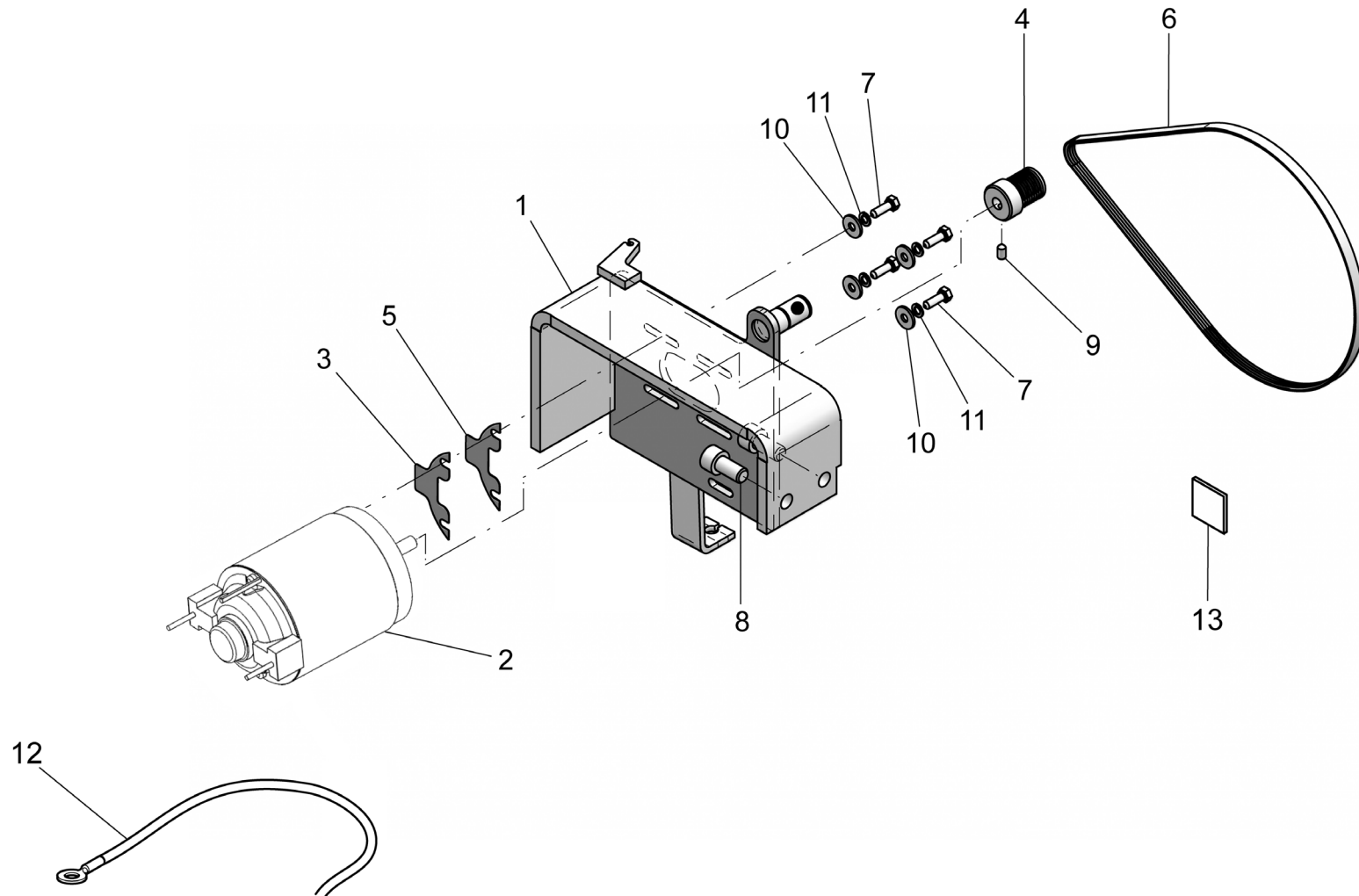
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Tavola N°2B - Rev. 0		129698700						1296-R018-0_R	



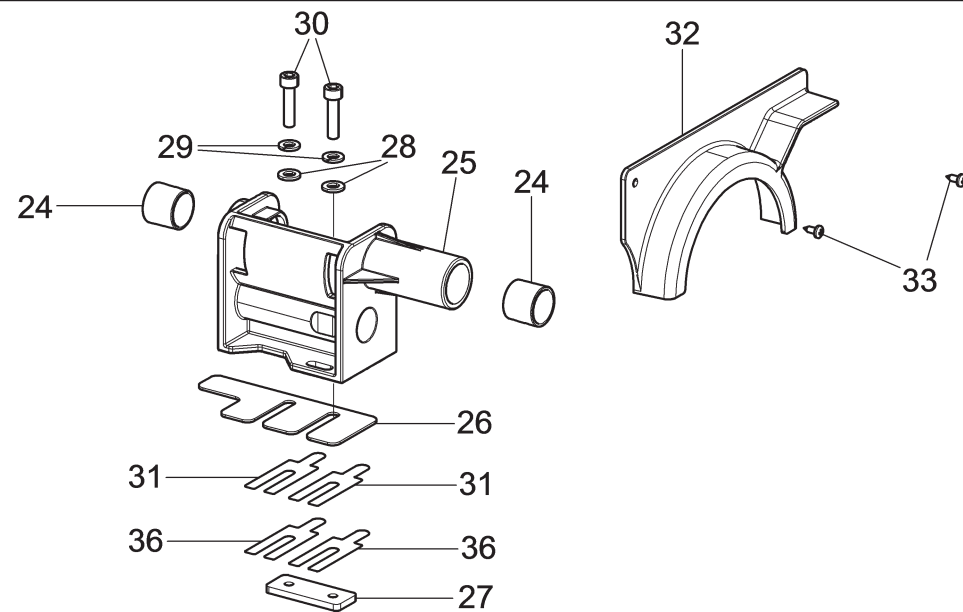
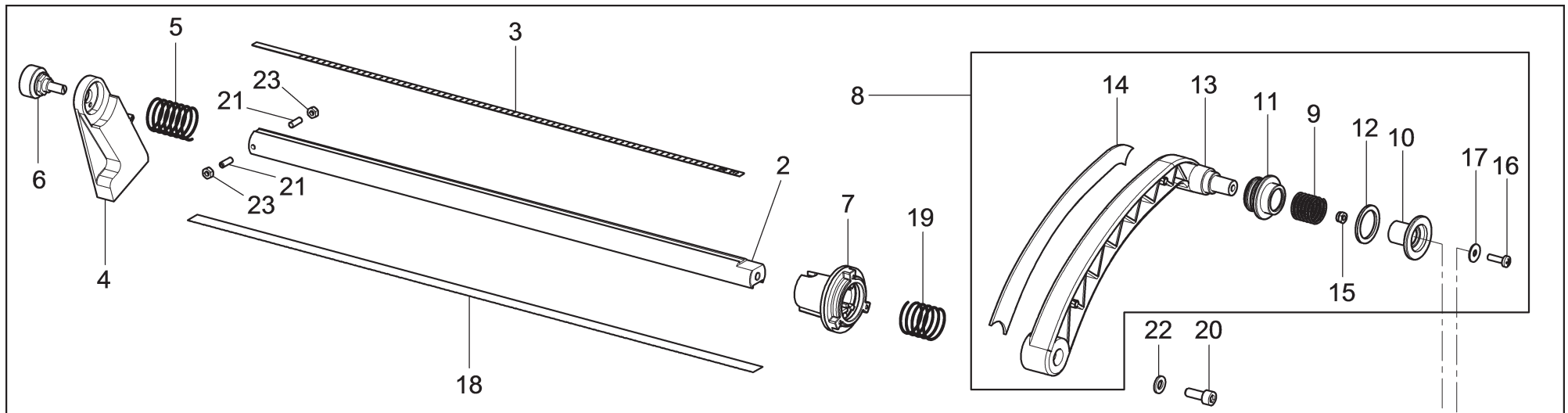
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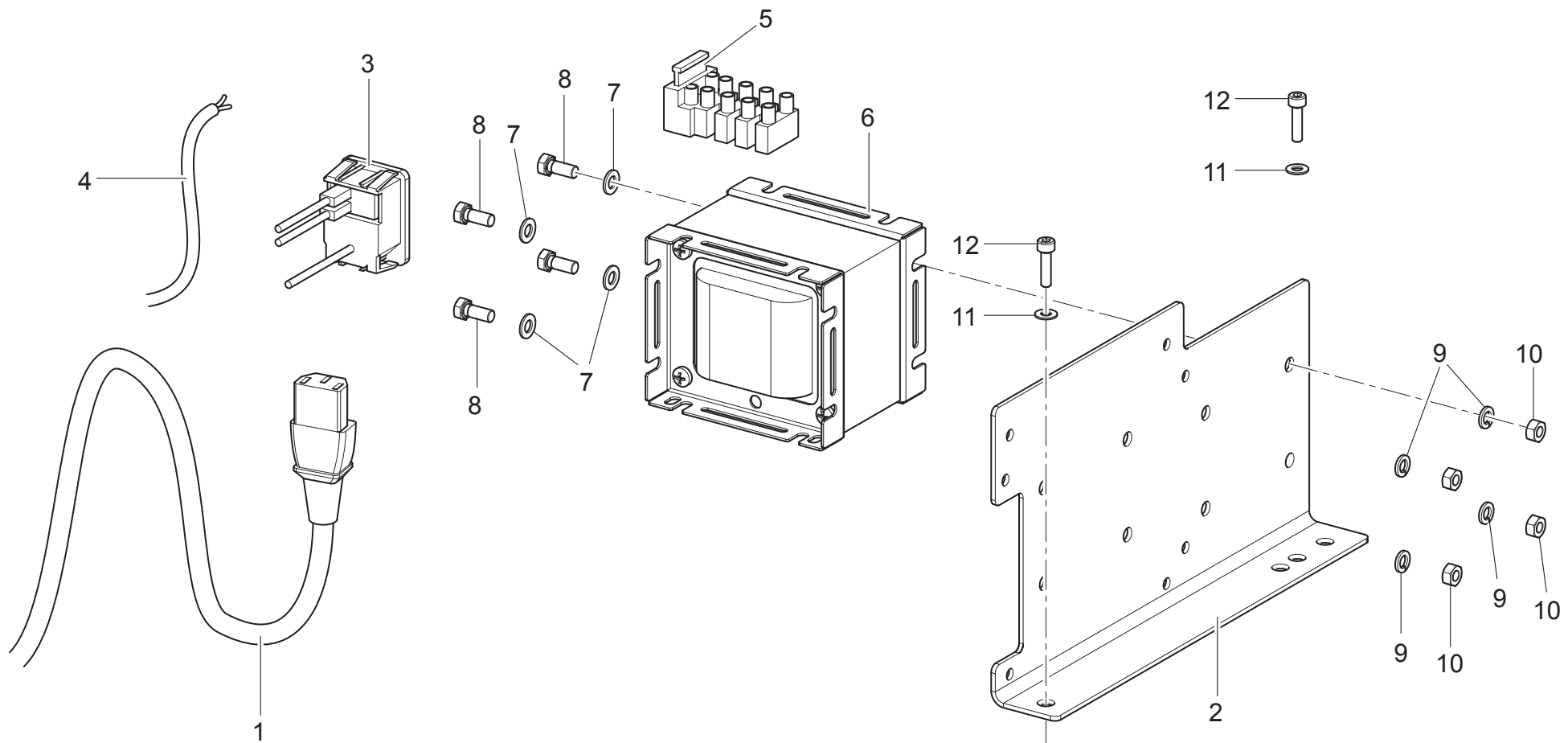
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Tavola N°4A - Rev. 0		129690061							1296-R018-0_R



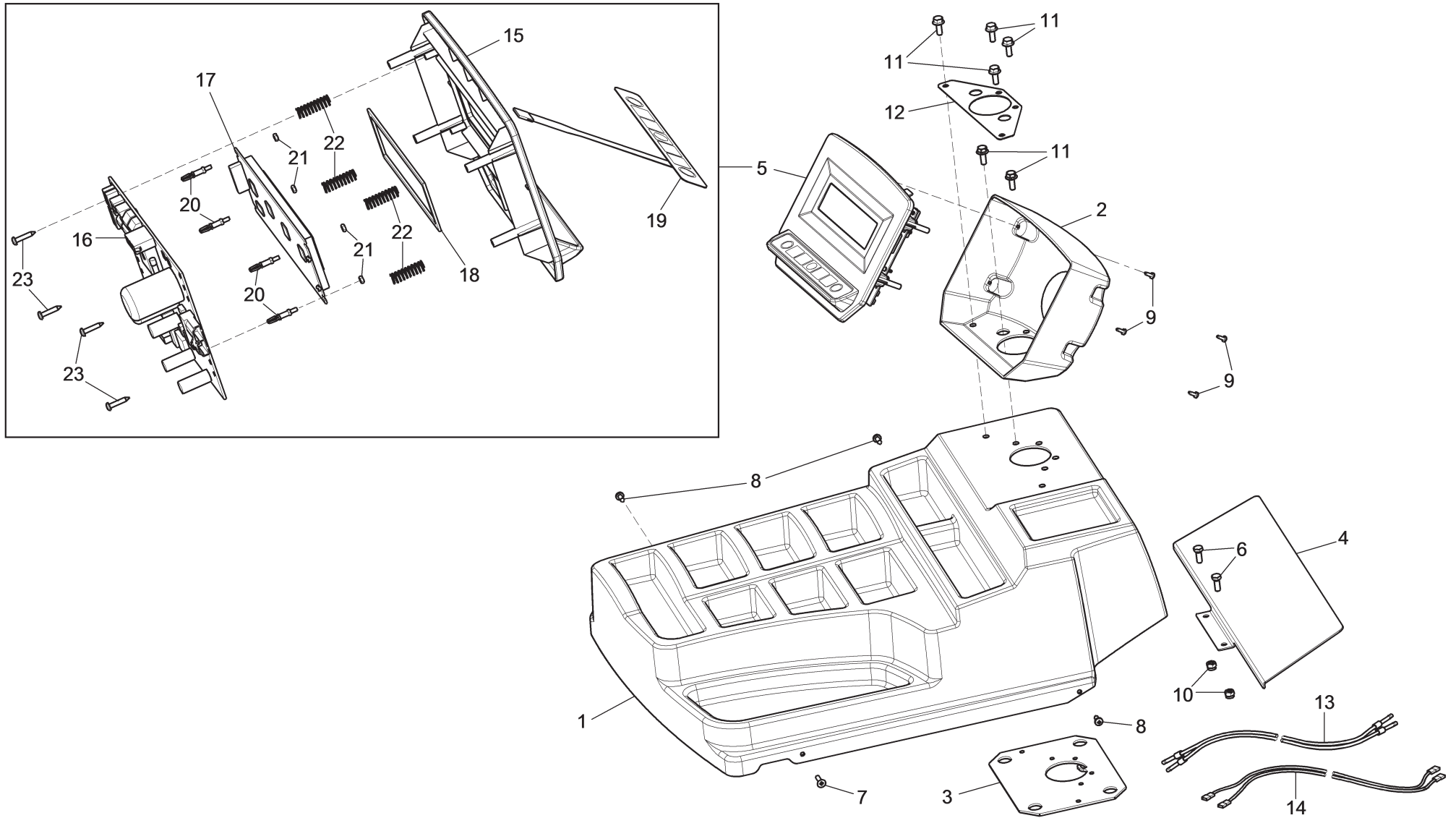
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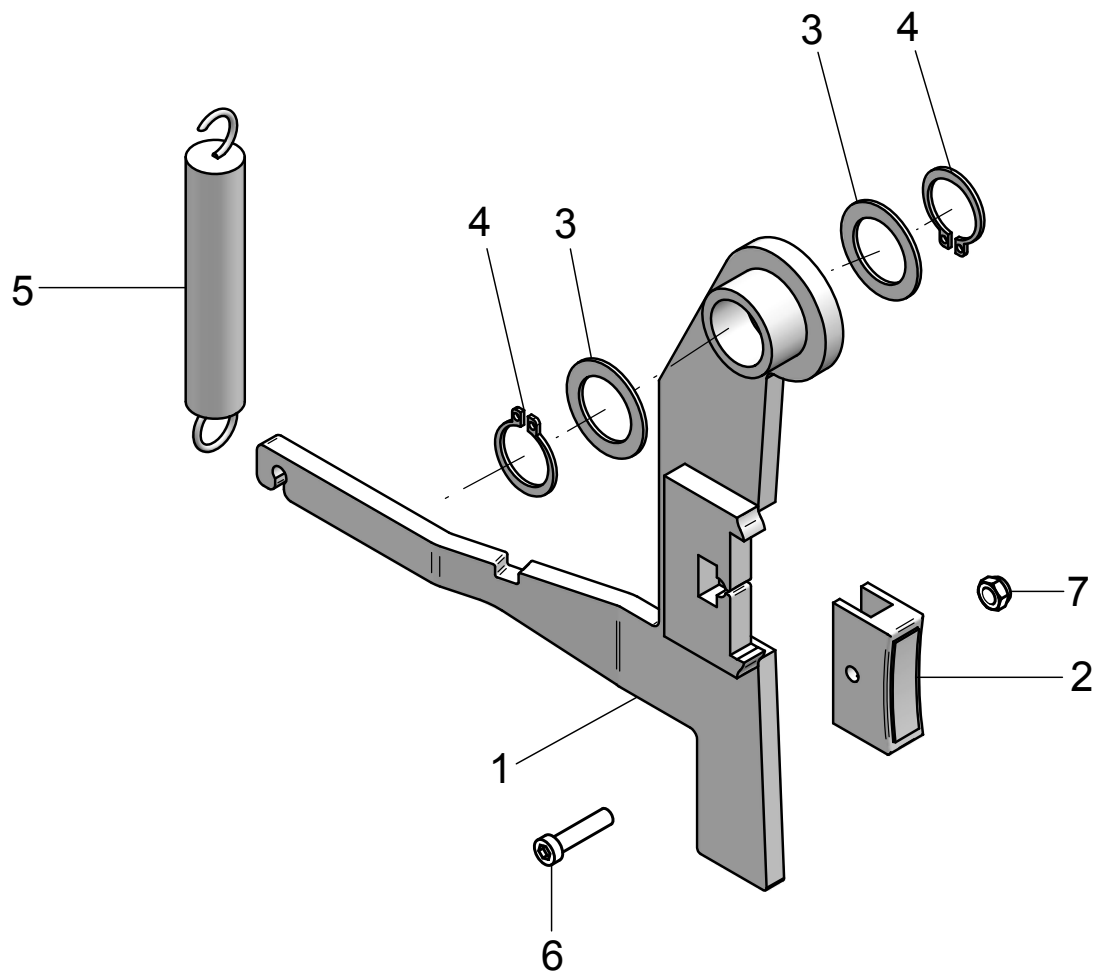
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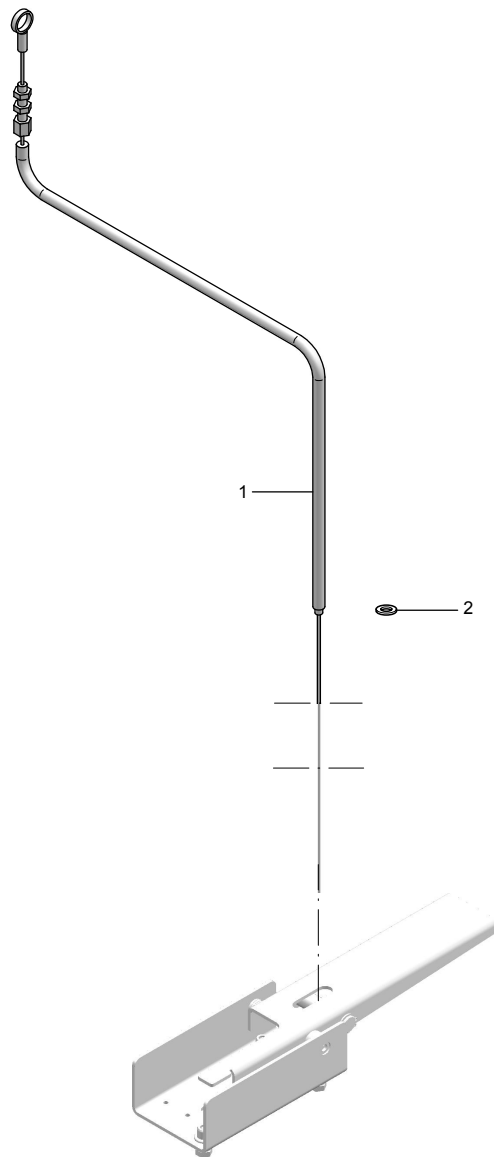
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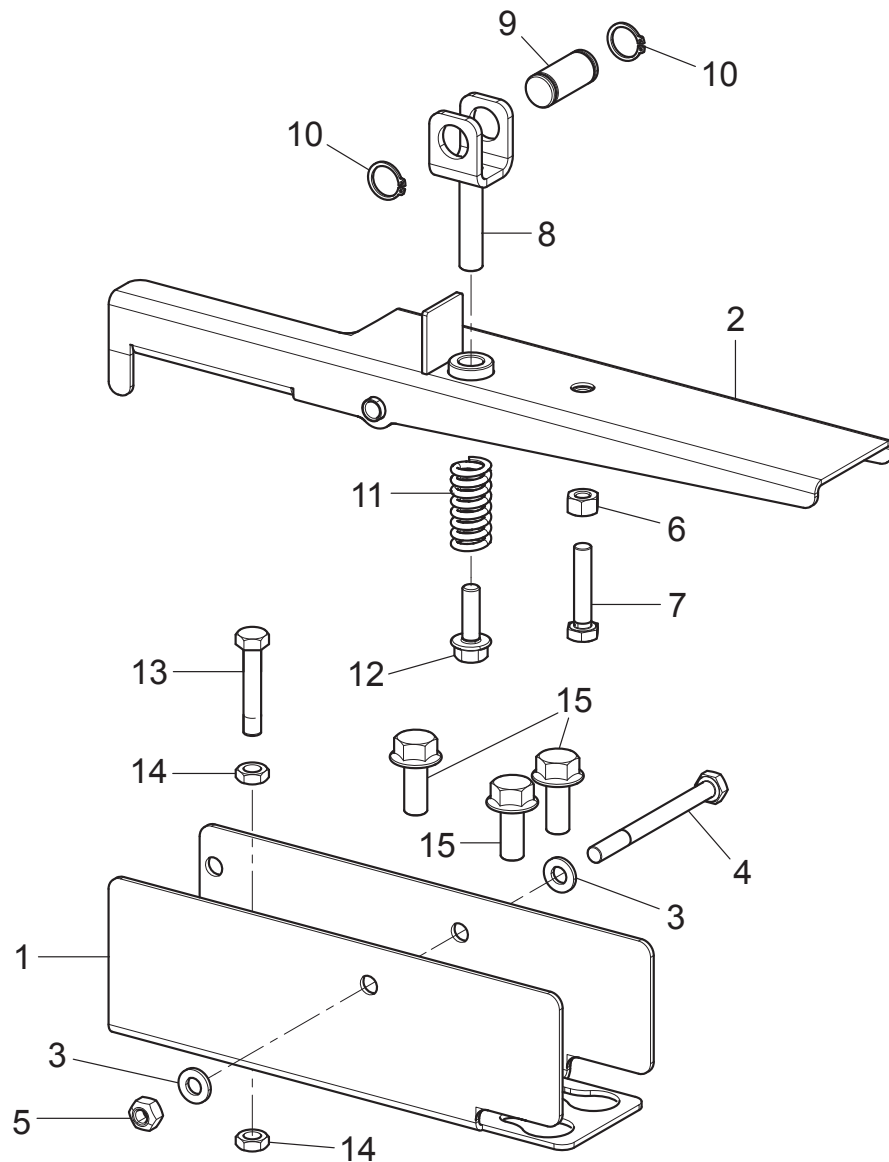
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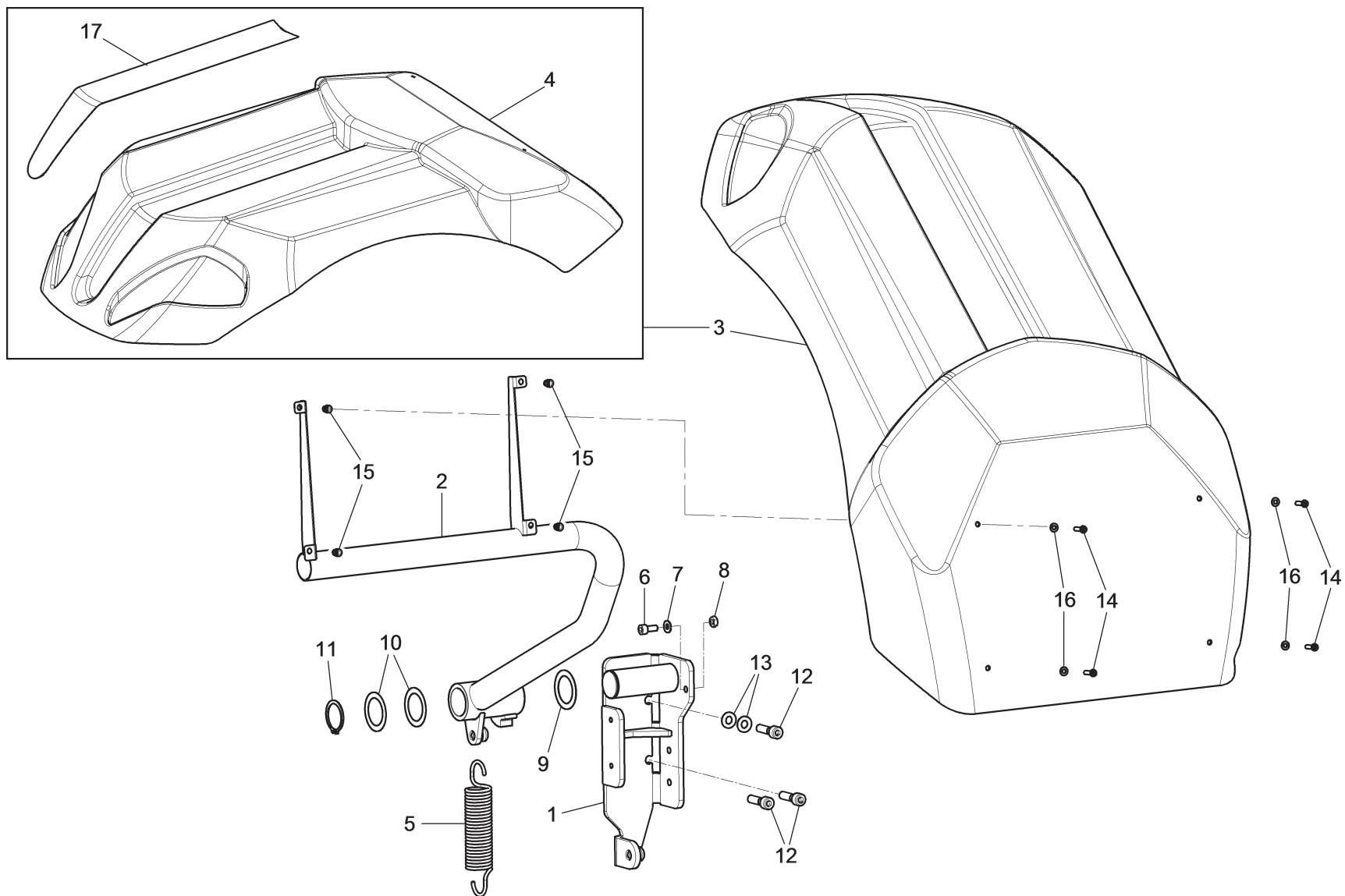
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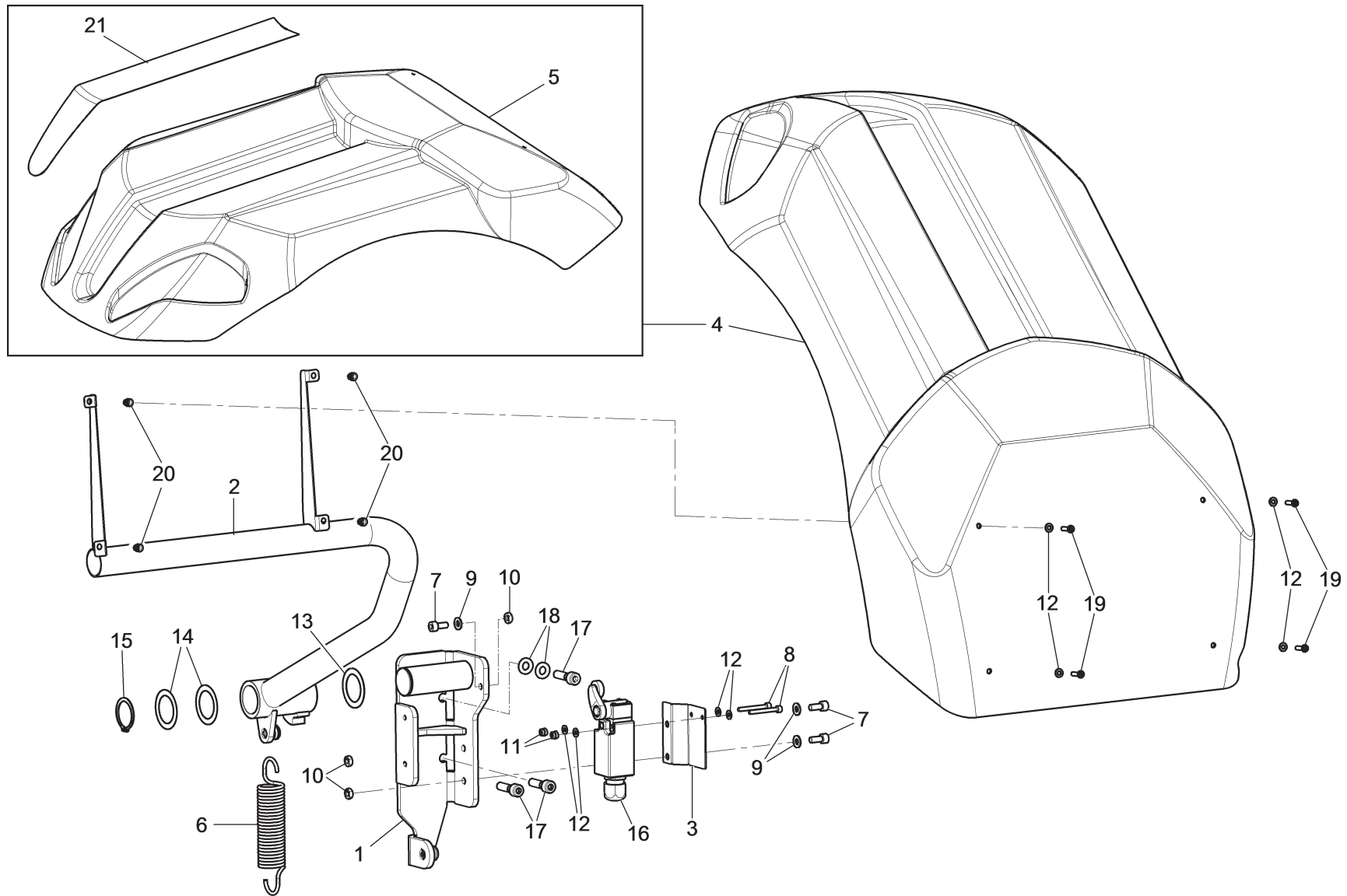
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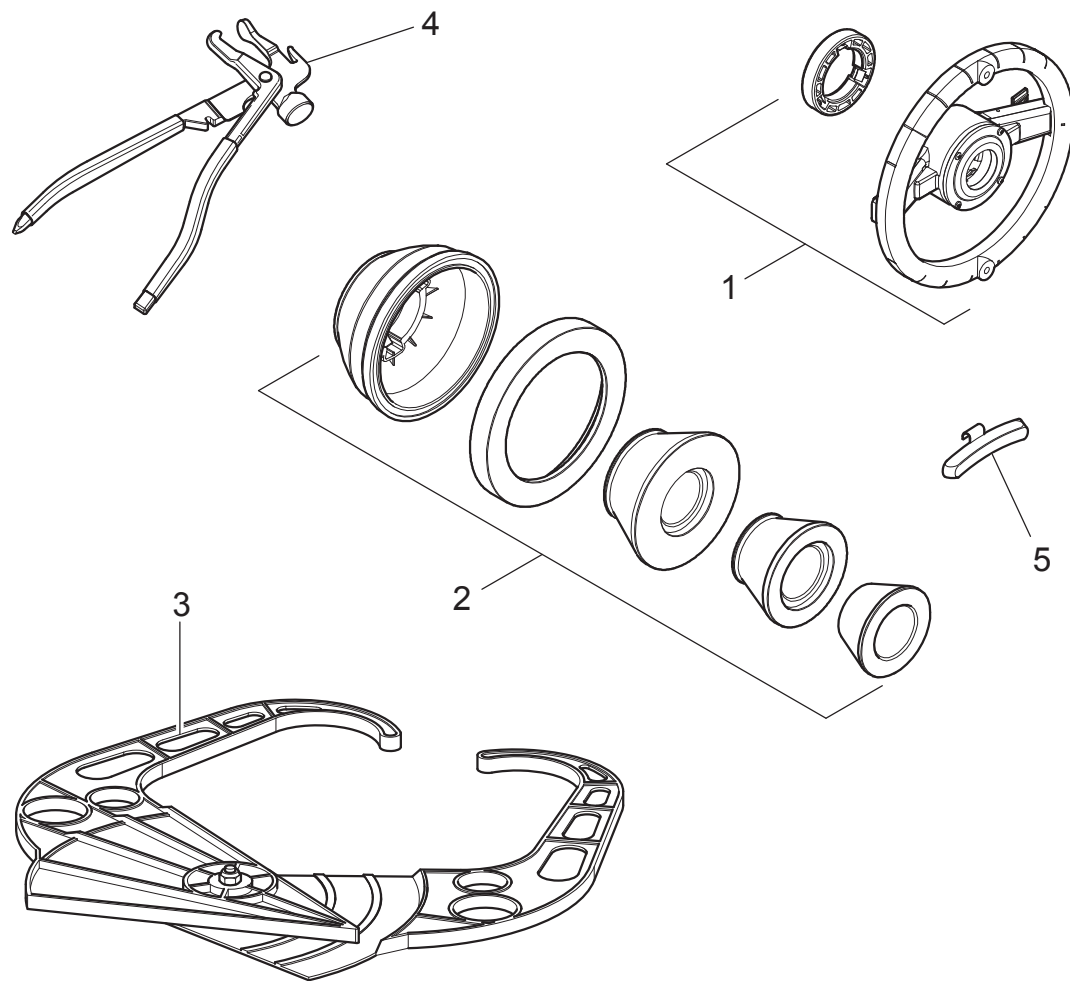
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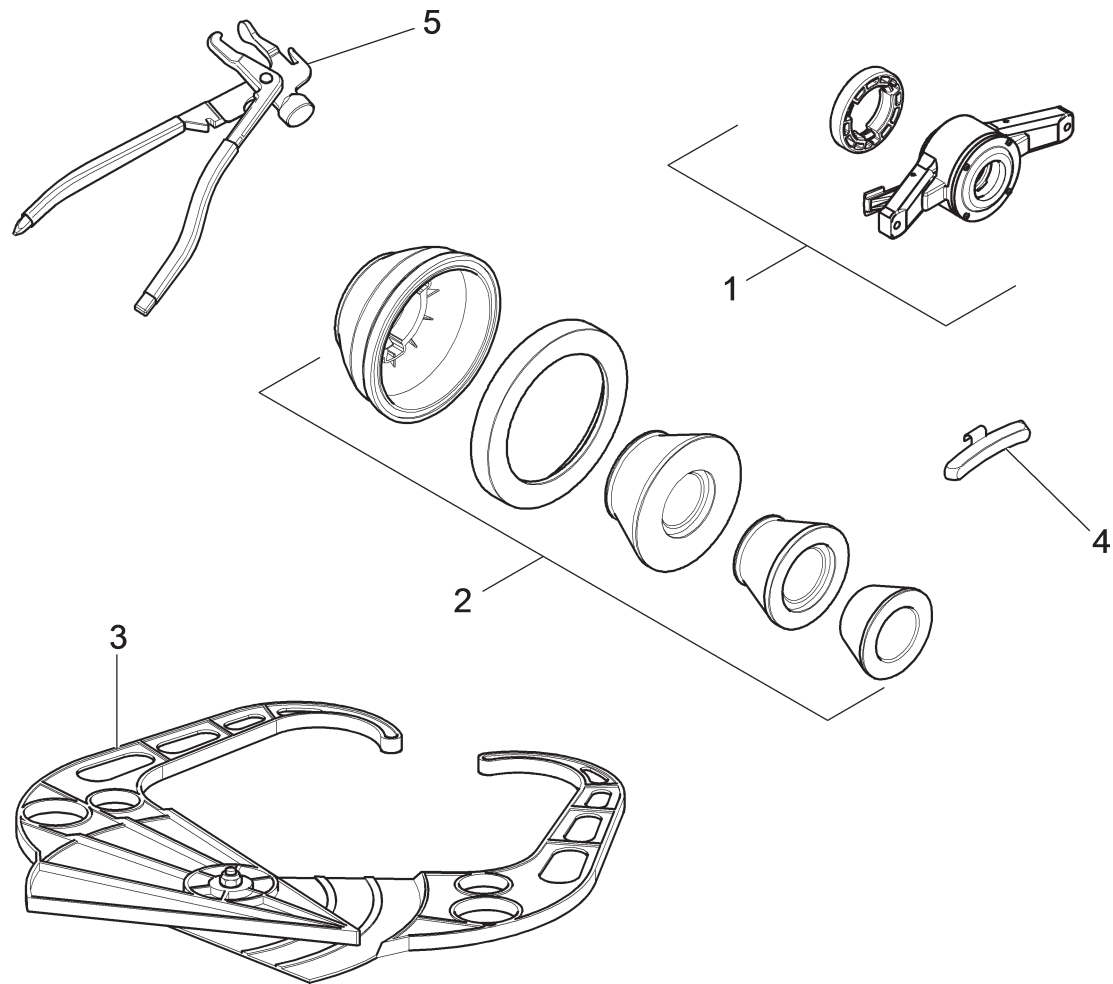
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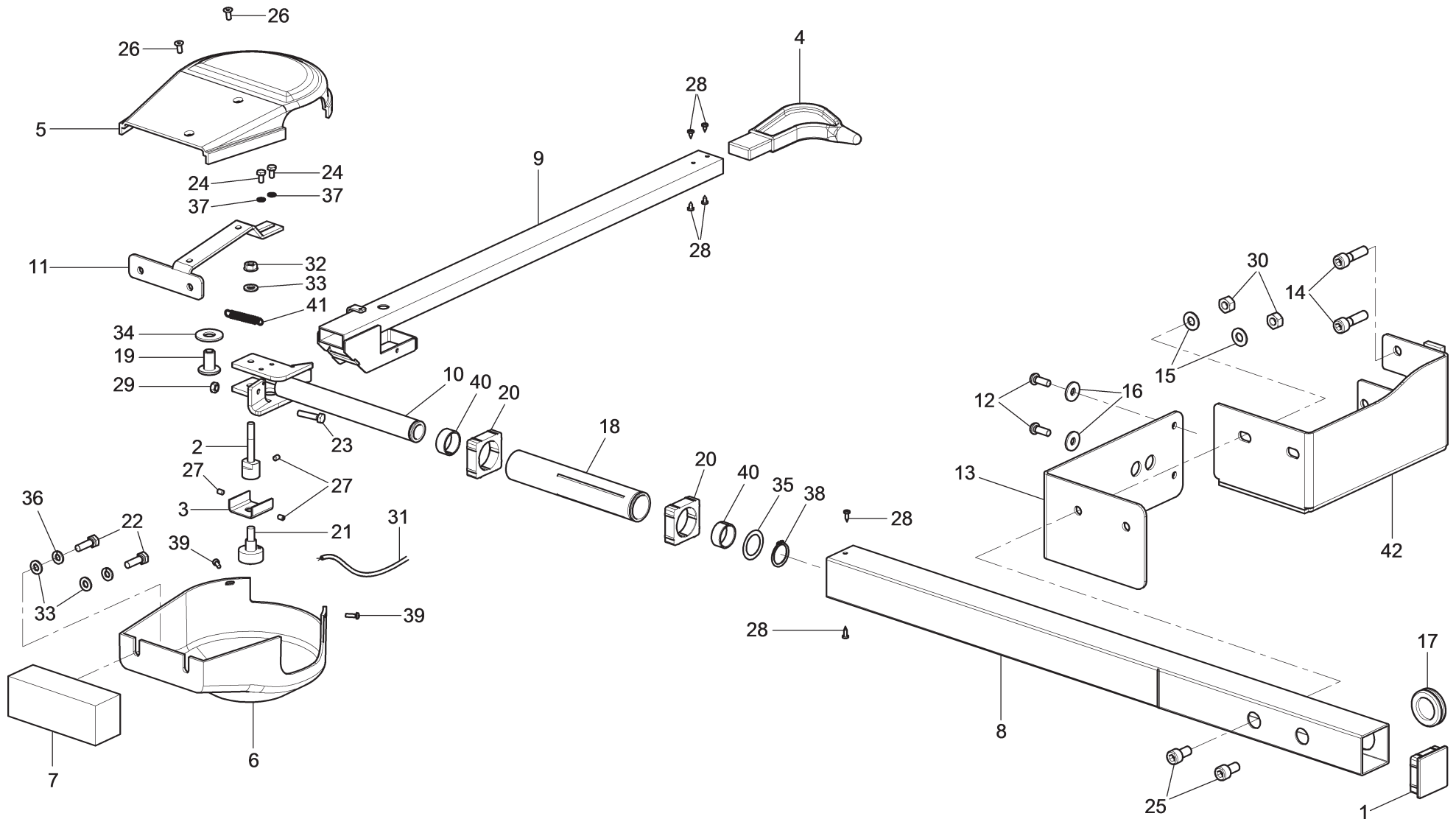
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		Tavola N°11B - Rev. 0		129698590				1296-R018-0_R




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			GAR301			Pag. 20 di 20		
			CALIBRO LARGHEZZA (OPTIONAL) WIDTH GAUGE (OPTIONAL) KALIBER FÜR BREITE (OPTZION) CALIBRE LARGEUR (OPTION) CALIBRE ANCHO (OPCIÓN)			1296-R018-0_R		